GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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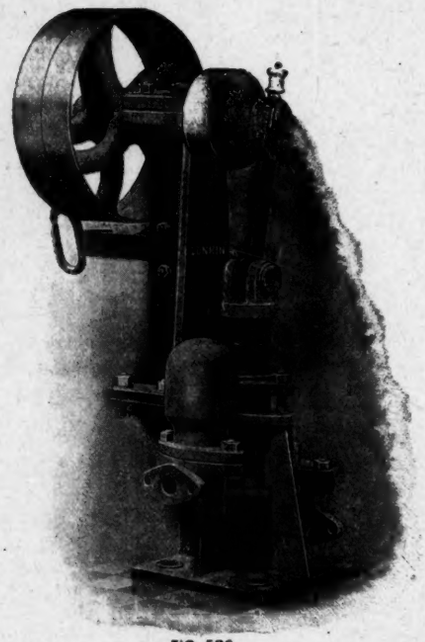

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EDITORIAL NOTES.

Individual and Collective Action—The Question of Precedents.

IN the comments we made some weeks since upon the report of the Directors of the South Metropolitan Gas Company, and subsequently upon Dr. Carpenter's speech at the meeting of the proprietors, and then the letter by Mr. H. E. Jones, published in our columns on Aug. 12, we referred to (1) the right of administrations of individual companies to take action upon matters which affect the undertakings in their individual capacity, and (2) the moral responsibility that rests upon them in taking action singly upon matters which are common to the whole gas industry, if thereby precedents are created which adversely affect the general interests of the industry. Our comments were primarily prompted by the announcement of the Directors of the South Metropolitan Gas Company, that they accepted, "lock, "stock, and barrel," the report of the Board of Fuel Research on the conditions they recommend should in future apply to the gas supply of the whole country —not to any particular company; and therefore the report is of collective importance, and, being of collective importance, demands concerted action. In our comments, mention was made of the name of Mr. A. M. Paddon, who is a Director of the South Metropolitan Company, the Chairman of the Brighton and Hove Company, and Chairman or Director of several other companies. At the meeting of the Brighton Company on Friday last, allusion was made by Mr. Paddon to our criticisms; and he there and then bluntly told the gas industry that he and his fellow Directors would, in any steps they might take in applying to Parliament, consider that Company and it alone. It will be remembered that it was pointed out by us that precedents conceived and encouraged in the interests of one undertaking might be embarrassing to others; but Mr. Paddon, with the same bluntness, assures the gas industry, through the proprietors of the Brighton Company, that this is a consideration that would not affect either him or his colleagues. "They would not," he added, "be deterred by the possible "effect in regard to any other undertaking whatsoever of "anything they might do to promote or defend the interests "of the Company." This is a clear declaration of policy—no matter whether the question is purely of a domestic character, no matter whether it affects the whole gas industry, no matter whether it might be prejudicial to the interests of many other companies, the Brighton Company will selfishly proceed to take its own course. "So long as "we float, it matters little to us whether you sink." That is, as we interpret it, the unequivocal meaning of Mr. Paddon's declaration. We are glad indeed to think this is not the spirit that animates the majority of the administrations of the gas undertakings of the country.

In our previous comments, it was distinctly pointed out that it was necessary to discriminate between purely domestic matters and questions affecting the general policy and well-being of the whole industry—that in matters of exclusive importance to a company, it was the duty of the Directors to take such steps as they thought proper; but in regard to such questions as those that are now hanging over the whole industry—over both large and small undertakings alike without distinction, and in every part and corner of the country—there should be brought to bear upon them the whole weight and influence of the industry, and that there should not be hundreds of different operations, through separate applications to Parliament to settle questions that should be once and for all dealt with and determined upon a common applicable basis. The financial position is one such question; and common principles should be sought out and established which can be utilized in dealing with every concern. Another such question is the report of the Board of Fuel Research as to the future basis upon which gas supply in respect of thermal quality and trading should be permitted. This report does not refer to any one undertaking, but to the whole; and therefore it is a matter upon which collective action is most desirable. We see a distinct difference between purely domestic matters, and matters affecting the whole industrial policy. This brings us to a further matter.

Mr. Paddon has a preference for individual rather than collective action. United and comprehensive action, he ventures to think, was hopelessly discredited by what happened when an attempt was made to obtain from Parliament some alteration in regard to the sliding-scale and standard prices; and the result of collective action, he asserts, was absolutely calamitous. He finds it is much easier for Parliament to refuse to comply with collective applications till absolutely obliged to comply with them. Mr. Paddon is not himself in this matter. His whole argument is the worst piece of logic that we ever remember having had from him; and it is clear that he attempted to frame his speech to fit the dual positions of Chairman of the Brighton Company and Director of the South Metropolitan Company. Let us say this so as to refresh Mr. Paddon's memory: It will be just as easy for Parliament to refuse *individual* applications next session in respect of these matters, as it was for them to do so in respect of financial hardships nearly two years ago, and compel collective action. There was no collective application to Parliament in regard to financial hardships. The matter was under discussion with the Board of Trade, when certain companies butted-in with Parliamentary Bills of their own, to deal with the matter as they thought best. The result was other companies were compelled to make applications, so as not to have the question settled and precedents formed without they had an opportunity of also putting their cases before Parliament. Precisely the same thing is happening in this case, save that the South Metropolitan Company have given good public intimation of their intention, without definitely specifying the details, of proceeding in the way they think best. In the "financial hard-"ships" case, therefore, it was Parliament and not the companies who brought about the collective action; and Parliament may do so again in this case of financial restoration on a sound basis, and of the future conditions of gas supply throughout the country. The Directors of the South Metropolitan Gas Company may propose; but it is Parliament who will dispose. At the same time, we are not a little surprised that Mr. Paddon should have spoken of the events in Parliament less than two years ago as being the result of a collective application to Parliament.

We suggested to Mr. Paddon that he and others knew well the disservice that some precedents have been to the gas industry. He does not put the matter quite the same way; but he says he does know the "value" of precedents. That is near enough for our purpose. The "value" of a thing may be good or bad. Let us suppose that the South Metropolitan Company by their action set up a precedent for 12 p.ct. of inerts, an unnecessary refinement in regard to sulphur compounds other than sulphuretted hydrogen, and a pressure higher than is necessary at the extreme ends of many gas-supply areas, would the other companies with which Mr. Paddon is associated be deeply obliged to the South Metropolitan Company if the precedent was also forced upon them. It is Parliament, and not

the South Metropolitan Company or the Brighton Company who settle these things; and what the major part of the gas industry suggests is that these are matters in which before Parliament gas undertakings should stand shoulder to shoulder.

Relations with Our Manufacturers—Then and Now.

THE gas industry has little, if anything, with which to reproach itself in the matter of having before the war taken part in swelling the volume of imports to this country. Practically all its manufacturing plant was made at home. There was evidence of a solitary gasholder contract having been given out to a German firm. But the prize was plucked out of the hands of the Germans by the war, which also put an end to the controversy to which the loss of the contract by our gasholder firms had given rise. There were some carbonizing ovens going up at one gas-works, the contract for which had also been obtained by a German firm; and, if we remember rightly, there was some long delay in proceeding with the work through the hospitality extended by our Government to certain of the contractors' employees. The coke-oven industry were for their carbonizing plant largely patrons of exotic firms; but the war has shown the coking industry that there are in this country firms of equal ability, whose productions are of equal efficiency, who can do all and supply all that is required. So far as our manufacturing plant goes, the gas and carbonizing industries generally are in the position to say to the German firms—who are hoping to obtain orders from them—"Hands off!" Generally speaking, the business relations between the gas supply part and the plant manufacturing part of the gas industry are now of first-rate order; and there is little over which there can be any grumbling.

There is at present, we know, some discontent over the prices of gas-heated appliances which never were supplied from abroad—for one reason because the foreign-made gas-heated appliances (at any rate, those we have come across) were not a patch upon the efficiency of those of our home manufacturers. There may be grumbling (and that not always deserved) about the want of imagination and initiative in the facial appearance of the goods of our home manufacturers; but in efficiency those manufacturers have led—and more especially since they incorporated scientific methods in their work of production—and it will not be through want of energy and research if they do not continue to do so. At any rate, we know it is their intention to make a good attempt to maintain their premier position. The question of current price is one which is being looked into on behalf of the industry generally by the National Gas Council; but the gas-stove manufacturers are confident that they are in a position to justify their present charges. We have heard the question asked why, if the administrators of gas undertakings are not satisfied with the charges, they do not co-operate, and become their own producers? There are certain legal obstacles in the way; but if there was any genuine case for their removal, we have no doubt removal there would be. But co-operative manufacture is something that in these days could not lightly be entered upon in competition with the existing manufacturers. They are established—have works, plant, and organization, mostly the product of pre-war times at pre-war cost. Co-operative enterprise and competition would thus have to establish itself under current conditions, and so be at grave disadvantage.

We turn to other fields. Before the war, gas-fittings, glassware, and incandescent mantles were largely imported. As was seen last week, the Government are for the time being protecting certain "key" and at present "unstable" industries, including illuminating glassware and mantles. We are not quite sure regarding glassware whether this country will be able to keep pace with demand with sufficient quantities, of the necessary quality and at popular prices, without the aid of production abroad. But this is a matter that needs investigation before coming to any settled determination. Evidently the Government are minded to give the home glass manufacturers a fair chance to meet requirements, which will become more extensive as there is return to normal lighting conditions. As to incandescent mantles, the institution of thorium nitrate works in this country, and the excellent organization of British mantle makers, should afford some protection against imported goods, with which the country was flooded before the war. About gas-fittings, nothing is said as to protection of the home industry. In regard to them and to mantles, there were some excellent resolutions made in the early months of the war. Now is the time to show that these resolutions were not mere passing sentiments, but something very real. In regard to mantles, gas undertakings should warn their consumers against purchasing anything that does not bear evidence of British manufacture. In fact, if gas undertakings got hold of the local retailers, and obtained from them a promise to sell only British-made goods of high quality, it would pay the gas undertakings to advertise the names of the retailers with whom such an understanding existed, and advise consumers only to purchase from them, if they did not do so from the gas undertaking's own showroom. There is no question that the inferior mantles obtainable from retailers before the war did immense harm to gas-lighting.

Above all things we have to remember that the country is in a condition now when the maximum production and the maximum export are needed; and it is essential that there should be the minimum import of everything that can be home produced in sufficient quantity and of adequate quality.

The Public and the Gas Industry.

THE gas industry is passing through a unique experience at the present time. Never in its whole history, as Dr. Carpenter was recently pointing out, has the diversity of the uses of gas been so great as now; and never has the public shown such desire to use gas, despite its high cost. The proof of this is supplied by the fact that, notwithstanding high cost, daylight saving, and the edicts of the Coal Controller, the consumption of gas is to-day (within a small percentage) that of the pre-war period. One reason for this is the price of coal to the householder and to industry; and another is that the consumption of gas can be controlled in a manner that is not a practical possibility with coal. The public realize these things; and further attestation is given by the large demand there is for gas appliances, with which demand gas undertakings are unable to keep pace—partly owing to shortage of supplies, and partly (this a matter of prudence) owing to the position of coal stocks, and the dubious outlook for the winter. In many respects, the gas industry is in a very unsatisfactory position; in others, in a very satisfactory one—particularly in the soundness of its business and potential expansion. Not, however, till the disabilities lift will it be seen how great is that potentiality.

The reasoning part of the public realize that the price of gas is something that is altogether beyond the governing power of the suppliers. But naturally they regret the increased cost of lighting, heating, and cooking. The regret is shared by the gas industry. Adversity has its lessons. In this case, the cost of gas induces consumers to get as much value from its use as possible; and this means economy. There is greater guarding against waste, which is an advantage to the industry. It realizes that every foot of gas wasted is against its interests; every foot of gas usefully employed bears testimony to its efficiency and serviceability. But there is one thing the public cannot understand. In some gas-supply areas the rental for meters, cooking-stoves, and heating appliances generally has likewise been increased; and they cannot appreciate why there should be an advance in the rentals of the meters, stoves, cookers, and fires fixed before the war. Where such increases take place, the public should be told the reason, and that clearly, so that all may understand. They do not comprehend that stove and meter repair, maintenance, replacement, and meter reading and inspection all cost more money, and that this has to be provided for either in the price of gas or in the rentals. It does not matter much to the gas undertaking which way it is provided. But there is a right and a wrong way. There is no reason why the increased costs should be paid in greater proportion by the large consumer of gas than by the small consumer of gas, whose meter, cooking-stoves, and fires are of the same number and capacities. It is much more consistent and fair that, in the case of such appliances, the increased costs attaching to them should be shared on the basis of the accommodation or service provided, than upon the extent of the use to which the appliances are put.

The "Daily Telegraph" has in an article called attention to these subjects—the increased cost of cooking, and the addition to hiring rates. The writer makes out that the price of gas has doubled in the case of the three London Companies and in that of the Wandsworth Company (miscalled in the

article the South Suburban Company). It has not been so, other than in the case of the South Metropolitan Company. Moreover, the sum of the accounts of the consumers taken individually does not show a doubled amount to be paid. This indicates that—making allowance for the fact that a 100 p.ct. advance has not so far been the case with all concerns—economy is being practised, to the general advantage, though from this prepayment consumers must be excluded. Generally speaking, in many districts these customers have been augmenting their pre-war use of gas. But as to the ordinary consumer, in view of the price of coal, the writer in our morning contemporary sees no other course open to the householder than to use gas in preference to coal in order to realize economy. In fact, he says "willy-nilly, the "gas-cooker must abide." Naturally, the gas companies are sorry for the consumers, and at the same time for themselves; for—this is a point that (as Mr. Honoratus Lloyd, K.C., lately said) the public do not understand—the higher the price of gas the lower the dividend in the case of most statutory gas companies. In treating of the hiring rates, the writer in the "Daily Telegraph" deals with the subject very fairly. But he is not quite correct when he says that most of the companies have ceased to hire-out cooking and heating apparatus to would-be new patrons. The Coal Controller interdicted new connections; but he has given a little more rope now, if the Local Coal Overseer is satisfied that the coal position of an undertaking will enable it to meet the extra demands upon it. So long as the undertakings are able to supply the gas, they are willing to connect new appliances, to the extent that they can procure them, for they are fully alive to the value of enlarging the base of their operations.

Another point that is at the present time exercising the public is the question why, in putting up the hiring rates, the user of an old stager in the way of a gas-cooker should pay as much extra as the user of a comparatively new one. As a matter of fact, the user of the old one perhaps ought to pay more, as he has been hiring it, and it has been getting near its last days, on the old prices for labour and materials, and therefore maintenance and renewal. It will have to be renewed earlier than the new one, and that on the modern higher terms. Now would be a good time, if there is objection to an addition to hiring rates, to revive as an alternative the hire-purchase system, making some allowance for the age of the apparatus. The only drawback to this is that it shifts the obligation for maintenance from the undertaking to the consumer; and the Board of Fuel Research have reported in favour of periodical adjustment of appliances being an obligation on the part of gas undertakings as one condition to the greater technical and commercial freedom that it is intended to confer on them. However, regarding the higher cost of gas, as well as hiring rates, the writer in our morning contemporary says that "most users would welcome some indication that in this "and other directions the final limit of their growing "burdens was visible." So would the responsible administrators of the gas undertakings. The indications must not be sought for in the gas industry, but in the coal and other industries from which gas concerns draw their supplies, as well as in the labour world.

Representations and Promises of Mr. Smillie.

THE coal miners are a much maligned class of workers; and, as workers, they are almost immaculate—not quite. At least that is what we understand to be the claim of Mr. Robert Smillie in an interview that has been published by the "Weekly Dispatch." He thinks it totally unfair that the country should get a wrong impression of the miners. So we suppose that it is all fiction that has been heard as to miners working less hours (apart from the reduction to seven), and playing more; as to much higher incomes for less work being an incentive to idleness; and as to men doing less work in order to avoid paying income-tax. In short, we are asked to believe the great drop in the production of coal (the almost sudden drop) is due more to the colliery owners than to the miners—that if ca' canny exists at all it is the owners and management who are practising it, and not the miners, and that no movement whatever exists among the latter to restrict output. Accepting Mr. Smillie's statement, we should also have to confess that we had misread or misinterpreted the meaning of the words used by certain miners' leaders when they asserted that there would be a further reduction of output if there were not nationalization. If the men, too, are generally doing their best, excepting a few revolters against the principle of a fair day's work for (what is now more than) a fair day's pay, we fail to see the reason for, and the value of, the evidence that was given before the Sankey Commission as to the men needing the stimulus of nationalization as well as emancipation from private enterprise, in order to induce them to put forward the best in work that is within them. We cannot somehow make one tale fit in with the other; but Mr. Smillie has no difficulty in the matter, because he does not try to make them fit. *Ipse dixit* is good enough for him; and he does not advance anything specific or positive in proof of his case on behalf of the men, nor his assertions as to the attitude of the colliery owners. We may linger a moment or two over some valuable statistics lately published by the Monmouthshire and South Wales Coal Owners' Association regarding the working in that coalfield during the twelve months ended July 12. The maximum gross number of possible attendances was 53,171,151; and avoidable absenteeism accounted for 8·3 p.ct. of the attendances being lost. Including strikes, the percentage of attendances lost was 9·5; and the estimated loss of output due to avoidable absenteeism and to strikes was 5,256,326 tons.

According to theory, but not practice, shorter working hours, giving more time for leisure and recuperation, are such a potent tonic that the men cannot avoid being greater producers than with the longer hours, which is a theory that must not be forced home to its logical conclusion, or there would be dire disaster. As a matter of fact, shorter hours do not mean greater production, unless the length of the working time has been beyond physical endurance, and fatigue prevented the best work being performed. We know of a manufacturing establishment in the gas industry in which there has been a reduction of hours of work to forty-seven per week; and the wages are on a scale undreamed of not long since. Has there been an increase in production there? Not a bit of it. The records of the company show a 25 p.ct. recession of production since the reduction of the hours by between 9 and 10 p.ct. There is throughout some industries—though the leaders of the unions do not care to confess it—a slackening-off which is not creditable in view of the wages now being paid and the lessened hours of work that have to be put in for the greater pay. We are not disposed to accept the avowal of the miners' almost complete innocence in this matter, and the owners' almost full culpability, *plus* the conditions under which the work has been, and is being, carried on, as the explanation of the disastrous shrinkage in the output of coal. We know there have been traffic difficulties, which have been partially accountable for a decline that has put the country into a desperate position. Mr. Smillie asks us to believe that the main responsibility lies at the door of the owners. He makes out a plausible tale, and invites inquiry. We have not the slightest doubt that inquiry would reveal that there was truth in what he says; but the proportion of truth and the proportion of whitewashing might not be found precisely in accord with the terms of Mr. Smillie's representation. He tells us that during the war there has been practically no opening-out or extending of the coal mines; that the arrangement under which the mine owners were granted their pre-war profits has not tended to increase the output; that in consequence a careless feeling among those responsible has permeated the coal industry from the top down to the bottom, even to the miners themselves; and that during the war work has been conducted where the coal was the most easily available. It is a very strange thing that, if the best and easiest available coal has been worked during the war, there has been a general outcry throughout the country over the rubbish called coal that has been delivered. Part of this is due to the want of picking; not all of it. And as to the picking, we were told over and over again that it was the miners who objected to women being engaged on this work during the war; and therefore, if true, their obstinacy in this matter inflicted a great uneconomy on industry, and an irretrievable wrong. Mr. Smillie's whitewash does not all possess the best adhesive properties.

Now as to the promise. If it is fulfilled, the whole country will be thankful. Mr. Smillie asserts that one reason why there is at present a material reduction of output is because numbers of men are being employed in developing the mines. This work cannot for some time yield an increase; but within a few months there should be developments which will augment by many million tons the output per annum, and then the price should be considerably

reduced. This, if reliable, is good news; but it is not the best. It is the probable situation in the approaching winter that worries the people, and the industries that give them employment. As to the price of coal, Mr. Smillie admits that a good average price of production to-day (he does not tell us the considerable percentage that the miners take of the cost) is 26s. per ton; but it was not many years ago that the country could buy at the pithead for 8s., 9s., or 10s. per ton. It is not suggested that this should be the case now; but the difference between these figures and the 26s. to 29s. per ton payable now is one which bears disastrously upon the country, and is an effective brake on progress. Mr. Smillie also informs us that the miners fully recognize the pressing need in the national interests for the largest possible production. That is a good thing. We hope the recognition will have good effect, for the miners have been working very diligently in trying to satisfy an enormous appetite for high pay and low working hours, to alter the course of the country's prosperity, and to reduce the velocity of its progress to a negative quantity. Anything which affects the country's prosperity and progress must affect the miners; and therefore they have unwittingly and through bad leadership been operating by their excesses against themselves.

Concerning the question of nationalization, Mr. Smillie says the next move rests with the miners. The matter is to come before the Trades Union Congress in Glasgow in September; but the Miners' Federation is going to take a very strong attitude in the matter, and intends to make it a test for organized labour. What does this mean? Does it mean that organized labour shall generally be given an opportunity of pronouncing on the subject of nationalization, or that it shall be utilized (if it consents) to bring its aggregate force to coerce the Government, and to break down democratic Government? It would be interesting if the President of the Federation would tell the country. However, at Glasgow the extremists are going to meet forces animated by reason and foresight.

Sulphate of Ammonia Prices.

We are not sorry the Government has withdrawn the subsidy given to sulphate of ammonia makers during the war—not for their benefit, but for the benefit of the farmers, who have been doing extraordinarily well out of the products of the land for which sulphate of ammonia is required as a fertilizer. We are not belivers in subsidies; and now the farmer has to pay directly for the sulphate of ammonia he requires during the eight months from October to May a price which has closer approximation to what is fair, having regard to the higher cost of coal, wages, and raw material. The Sulphate of Ammonia Association has worked hard to secure prices more in harmony with the conditions of to-day; and they have been (shall we say?) fairly successful. But though the Board of Agriculture considers the prices allowed for not less than 2 ton lots—ranging from £20 10s. per ton for October delivery to £22 for March-May delivery—are not more than are necessary to secure the manufacturers a reasonable trade profit, we cannot regard them as the full prices to which the makers are entitled under the current circumstances of production, and having regard to their patience under restraint and inadequate prices during a large part of the war. But is it not time that the Board of Agriculture left the makers to settle their own business transactions with the farmers, while (if they will) ensuring that a sufficient supply is retained in this country for meeting its requirements?

East Greenwich Research Station.

There is at the moment little to add to the information, published in our columns last week, as to the position of the East Greenwich Research Station of the Fuel Research Board. There was no ground whatever for the article and insinuations that appeared in the "Westminster Gazette;" and this was shown by our comments. If there is one group of men the Government have called to their assistance during the war who will see the work entrusted to them carried through, it is Sir George Beilby and his colleagues. The construction of a research station of the character required for so vastly important an investigation as that into our fuel supplies for the purpose of ascertaining how best to conserve them by putting them to the utmost possible use, is not a thing that can be conceived, planned, and brought to perfection in a day; and the Board were, of course, powerless in face of the resistances brought to bear on their work by the war. However, to correct the erroneous impressions created by the "Westminster Gazette" article, the Board have circulated information to the Press. This does not add much to what we were able to say regarding the article last week. But it is interesting to learn authoritatively that the buildings are practically complete, and a great part of the plant has been erected. It has been alleged that the purpose of the station is merely to investigate the utilization of inferior coal and colliery waste. This is not the case. The station is an experimental one, established by the Government to carry out the scheme of research of the Fuel Research Board, as outlined in their report issued in the autumn of 1917. The Chief Engineer of the station is Engineer-Commander Shaw, R.N., whose services have been lent by the Admiralty for three years. The services of Prof. Thomas Gray, as Chief of the Laboratory and Chemical Staff, have been lent by the Royal Technical College, Glasgow.

The Cost of the Yorkshire Strike.

This country and the whole of Europe are in a grave position in regard to coal supply; and the Yorkshire Coal Miners' Association know this full well. But the leaders persisted in their senseless policy lately, and are now sitting in the midst of disappointment, while resentment is being hurled at them from all quarters. The Labour Correspondent of the "Daily Telegraph" has been making computations as to the cost of this piece of hot-headed obstinacy both to the miners and the country. In the "country" is included the gas industry, which is a very large consumer of Yorkshire coal. During the five weeks' stoppage, there was a loss of 4 million tons of output; and at some of the pits the hewers cannot yet get to work, and have to sit idly watching the operations of reparation over the foolish action of withdrawing the pumpmen and repairers. In the first month from the decision to resume work, there will be a loss of a million tons, making with the 4 millions a loss of output equal to 5 million tons. The market value of this can be easily computed. The loss in wages already has been about 3 million pounds, and another three-quarters of a million will result. Something like £375,000 has been paid out of the funds of the Union; and it is reckoned that the Union will have lost an aggregate amount of £450,000. There is, for instance, the permanent loss of interest and income from subscriptions. Then the loss to the country and to Yorkshire industries and workers has been immense. So reckoning one loss with another, the Labour correspondent of our contemporary arrives at the total cost of this piece of folly being in the neighbourhood of 20 millions.

Labour's Awakening.

During the past week, there have been several pieces of evidence that show there is an awakening in the labour world, and that a new light has fallen across the paths of many of those who are influences in that world. The movement is a welcome sign. Labour leaders, other than those of extreme leanings, are becoming more alive to their responsibilities. Power has its responsibilities, and trade unionism in this country is a force, with power for good or evil. It is to the advantage of trade unionism that this power should be wielded for the common good; for if it is wielded in the contrary direction, it means disaster for the community generally, which community includes labour. This is what is being very widely recognized by labour leaders; and the fight will now be between them and those leaders whose extremist views would pull labour farther and farther along the road to ruin. A notable letter was sent by Mr. Brownlie to Mr. Bowerman during the week. One passage reads: "With power come responsibilities; and however much we may reject the criticism of those who are not trade unionists, we cannot evade our responsibilities to the community." It may be asserted that never has Mr. Smillie uttered words by which that principle has been put forward as the dominant motive of the course which should be taken "to alleviate the situation on behalf of the workers of the nation."

Patriotism and Production.

Mr. Bowerman has said very much the same thing. Mr. W. Adamson, the Chairman of the Parliamentary Labour Party, and Messrs. Appleton, Roberts, Clynes, Barnes, and others agree.

They all recognize the responsibility of labour in the present crisis, and in the maintenance of the prosperity of the country. Higher wages and shorter hours of work cannot, they admit, be supported without intensive production. Failing greater production, the higher wages and the shorter hours must come down like a house built on moving sands. It is realized now how poorly we stand in comparison with America in the matter of production, and that the workers of America have, through their production, a greater stability than the workers in this country. Once upon a time trade unionism looked upon machinery as the enemy of labour and employment. Now it is advocated by responsible leaders. It is seen that production is the friend of labour, and the way to increased employment and capacity to pay. It is also urged that necessary material must be secured, and transport be reorganized. With all of this there is agreement. Particularly must the production of coal be increased; otherwise, there will be disaster in which the miners and labour generally will be engulfed. We cannot be content with an annual output of 226 tons of coal per worker, while America can boast of 770 tons. This question of increased production in industry generally is going to be discussed at the Trade Union Congress in Glasgow next week, when Mr. Smillie will also raise the banner of nationalization, and perhaps something will be said as to "direct action." The country will keenly watch whether the wisdom of the patriotic labour leaders will prevail, or whether those will succeed who are trying to drag labour further along the path to ruin.

James Watt Memorial and Centenary.

We feel sure that the movement to found in Birmingham an international permanent memorial to James Watt will commend itself to all identified with engineering. His life's work was bound up with that of his fellow geniuses, Boulton and Murdoch; and therefore it is fitting that the gas industry should feel a special interest in the movement. While to Murdoch it owes so much, to Watt it is indebted not only for his interest in the work of Murdoch, but for mechanical strides that helped so largely to expand industry, and so gave to the gas-industry enlarged opportunities. It is fitting that Birmingham should be chosen as the setting for the memorial; for it is there that Watt spent the greater part of his life, and built his engines. The form of the memorial is, first, the endowment of a Professorship of Engineering, to be known as the James Watt Chair, at the University of Birmingham, for the promotion of research in the fundamental principles underlying the production of power, and the study of the conservation of the natural sources of energy; secondly, the erection of a memorial building which would serve as a museum for collecting together samples of the work of Watt, Boulton, and Murdoch, as well as a meeting-place and library for scientific and technical societies, and be a centre from which engineers could co-operate in spreading scientific knowledge. A large and influential Committee has been formed for giving effect to the scheme. Among the names we see those of Sir Dugald Clerk, D.Sc., F.R.S., and Mr. W. Chaney, representing the Institution of Gas Engineers who, among many other scientific and technical societies, have given approval to the scheme. It was in 1819 that James Watt died, at the age of 83, seventeen years before which Soho Foundry was publicly lighted with gas (Peace of Amiens). So a hundred years have passed since the great man died; and a commemoration is to be held in Birmingham from Sept. 16 to 18.

Investments in Germany.

The proprietors of the Imperial Continental Gas Association will be pleased to learn that preparations are well in hand for the liquidation of enemy debts. The huge task is to be entrusted to the Board of Trade; and a scheme involving the creation of a separate department is now being prepared. Many millions of money will have to be dealt with; and it is computed that at least three years will be occupied in negotiating the work. The new Sub-Department will deal with: (1) Debts payable before the war, and due by a national of one of the contracting Powers, residing within its territory, to a national of an opposing Power, residing within its territory. (2) Debts which became payable during the war, of which the total or partial execution was suspended. (3) Interest which became due before and during the war. (4) Capital sums which became payable before and during the war. It is understood that debts are to be paid in the currency of this country or its dominions, or, if in some other currency, at the pre-war rate of exchange. The payment of the debts and all communications must be through the Board of Trade Clearing House.

Railway Rates and Restrictions.

Rumours have been floating about that the Government are preparing a new scale of railway charges for all goods, with the view of lightening the present subsidy, and making the basis of railway operations more self-supporting. The information is not yet of a definite order; but on the Coal Exchange it is rather feared that the railway charges cannot be increased without including coal. This is a dull outlook. A brighter one is that the Board of Trade has announced that with a view to assisting in the restoration of normal conditions, it has been decided that the restrictions imposed on the transport of coal by rail under the Coal Transport Reorganization scheme shall be suspended as from yesterday until further notice. A general permit has been issued to give effect to this decision.

PERSONAL.

Sheffield Gas Company's New Engineer.

Mr. HORACE CHAMBERLAIN, the Engineer and Manager of the Workington Gas Department, has been appointed Engineer to the Sheffield Gas Company, in succession to Mr. W. H. Johns, who, as already announced in the "JOURNAL," has been appointed Engineer and Manager to the Swansea Gas Company. Mr. Chamberlain commenced his career with the British Gas Light Company at their Potteries station, and remained there for three-and-a-half years, during which period new works of 2½ million c.ft. capacity per day were erected. In 1903 he was appointed Assistant Engineer and Manager to Mr. John Young at the Hull works of the Company, and served under him for ten years. During this time Mr. Chamberlain supervised the erection of new plant, &c., at the chemical works, and also a complete installation of continuous vertical retorts for 2½ million c.ft. per day. In 1913 he was appointed to his present position, where he has designed and erected a complete 1 million c.ft. plant, with continuous vertical retorts, which has worked very successfully for the last two-and-a-half years. During the war he held the honorary position of Ministry of Munitions Representative for Cumberland, in respect of the production of toluol and ammonia. While at Hull, he acted for three years as Lecturer on Gas Engineering and Gas Supply at the Hull Municipal Technical College; and he holds first-class honours certificates in these subjects.

Lieutenant HARLEY A. STEPHENSON, R.E. (I.W.T.), has recently been invalided home, after serving 2½ years in Mesopotamia, and is, we are glad to hear, now on convalescent leave. He was mentioned in despatches in October last.

Mr. M. J. TREACY has now left Wicklow, to take up his duties as Manager at Fermoy. Mr. L. W. DALBY, formerly of Magherafelt, who has been appointed to succeed Mr. Treacy at Wicklow, has already gone there. The new Manager at Magherafelt is Mr. F. C. MILLAR, until now Assistant at Cookstown.

STATUTORY UNDERTAKINGS (TEMPORARY INCREASE OF CHARGES) ACT, 1918.

Last Week's Applications for, and Grant of, Orders.

APPLICATIONS for Orders under the Act have been received by the Ministry of Health from the

Bakewell Urban District Council,
Barry Urban District Council,
Batley Corporation,
Bury Corporation,
Ellesmere Urban District Council,
Morley Corporation,
Newcastle-under-Lyme Corporation,
New Mills Urban District Council,
Rickmansworth Urban District Council,
Rotherham Corporation,
Rothwell Urban District Council,
Sandwich Urban District Council,
Sidmouth Urban District Council,
Silsden Urban District Council,
Teignmouth Urban District Council.

The Ministry of Health have made an Order authorizing the Kirkby-in-Ashfield Urban District Council to increase the price of gas from 4s. 6d. to 5s. 6d. per 1000 c.ft.

Mr. Peter B. Watson, of Wishaw, who is Secretary and Treasurer of the North British Association of Gas Managers, has been appointed traveller and representative for Scotland by the Sutherland Meter Company, Ltd., of Birmingham.

THE LATE PROFESSOR VERNON HARCOURT.

A RETROSPECT AND AN APPRECIATION.

THE particulars given in last week's "Obituary" [*ante*, p. 439] of the life of Prof. A. G. Vernon Harcourt, D.Sc., who died on the 23rd ult. at St. Clare, Ryde, may be supplemented by some further account of his association with the gas industry.

Harcourt graduated at Oxford in 1858, having taken a first-class in the Honour School of Natural Science, which had then been established only some five years. Probably through his collaborator in chemical research, W. Esson, whose father was the Manager of the Cheltenham Gas-Works, Harcourt's attention became directed (some time before 1870) to the dual questions of the estimation of sulphur in gas and the purification of gas from sulphur compounds; and in that year he obtained provisional protection for "Improvements in the Purification of Gas" ["JOURNAL," Vol. XX., p. 867]. Working at the Oxford Gas-Works, he pursued both the testing problem and the purification question. One result of this study was the development of "Improvements in the Purification of Gas and in the Extraction of Residual Products therefrom," of which he and F. W. Fison were joint patentees in 1873 ["JOURNAL," Vol. XXIII., p. 703]. One procedure followed by Harcourt was the insertion of a mass of iron turnings, &c., in the mouth of each retort after charging—resulting in the conversion of any carbon disulphide in the gas into sulphuretted hydrogen. Another procedure was the scrubbing of gas with water containing oxide of iron in suspension, with the object of effecting economically the extraction of sulphuretted hydrogen and ammonia, and of ultimately recovering them as sulphate of ammonia.

In 1870, also, Harcourt introduced a process of estimating sulphur in coal gas, and from it evolved the well-known Harcourt sulphur test. He appears even then to have foreseen the practical application to the purification of coal gas of the principle underlying the test—viz., the passage of the gas containing the carbon disulphide over heated material. The first form of his test was described in a paper he read at Liverpool in 1870; and in April, 1872, he gave a Friday evening discourse at the Royal Institution, "On the Sulphurous Impurity in Coal Gas." On Sept. 1, 1872, Harcourt was appointed one of the Metropolitan Gas Referees. Prof. Tyndall received his appointment at the same time—their colleague being Dr. William Pole, who had been appointed a year earlier. Harcourt retained his appointment for forty-five years—resigning in 1917, to give place to one of his old pupils, Mr. W. J. A. Butterfield.

Mention of his pupils recalls the fact that as Lee's Reader in Chemistry at Christ Church, Oxford, from 1859, Harcourt had among them the late King Edward VII., Prof. Harold B. Dixon, Prof. H. Brereton Baker, and many others whose chemical studies were later rewarded by election to "F.R.S." As a teacher of inorganic chemistry, and especially exact quantitative analysis, Harcourt was unsurpassed; and a bench in the small Christ Church laboratory was eagerly sought after during his tenure of the Lee's Readership.

Harcourt's broad interest in the technique of the gas industry was well displayed in the lecture he gave in 1875 before the British Association of Gas Managers ["JOURNAL," Vol. XXVI., p. 226]. In this lecture he dealt with problems of purification in an original and suggestive manner; and, towards the close, he said that he was working on the production of a standard gas, consisting of hydrogen carburetted with the lighter hydrocarbons of petroleum, which he hoped would serve as a standard by which the illuminating power of different grades of coal gas could be assessed more accurately than by comparison with standard candles. The same idea permeated a lecture which he delivered in 1876 before the Royal Society of Arts, in which he gave details of the preparation of his hydrogen-pentane, and recorded the results of testings made with it ["JOURNAL," Vol. XXVII., p. 620.]. While the proposed method of testing the illuminating power of gas did not commend itself to us, we stated in our editorial "Circular" [*ibid.*, p. 606] that Harcourt had already "thoroughly identified himself with gas interests, regarded from a scientific point of view, and his appointment as a Gas Referee has always been a source of satisfaction to us."

In a paper read in August, 1877, before the Physical and Chemical Sections of the British Association, Harcourt described a "New Unit of Light for Photometry" ["JOURNAL," Vol. XXX., p. 337]. He had given up hydrogen; and the new unit consumed a standard pentane air-gas, and was the precursor of the numerous pentane air-gas standards which he and others brought forward, until (in 1897) he reached finality with the ten-candle lamp which is now the accepted International Standard of Light. His 1877 standard was a one-candle flame, fed with standard pentane gas from a gasholder; in 1883 he brought out a portable one-candle air-gas flame; and in 1887 a one-candle pentane lamp, which was fairly extensively used, but which fell into disrepute owing (as it subsequently transpired) to failure on the part of the makers to adhere to the specified dimensions. All these one-candle standards were without glass chimneys or screens; but when Harcourt first essayed to produce a ten-candle standard, he did not similarly see his way to dispense with a glass chimney, with all the uncertainties its use involves. His first and second ten-candle pentane lamps, produced in 1894 and 1895, both had glass chimneys; and it was not till 1897 that he got rid of the glass chimney in the design of lamp which from 1898 onwards replaced standard candles in the official gas-testings in London.

Harcourt's work on the Standard of Light will be that by which his name will be best recalled by posterity in general. But with the passing of the illuminating power standard for gas, it is not unlikely that future generations of gas managers will remember best his work on the purification of gas by heat, and his colour test for sulphuretted hydrogen and carbon disulphide. A useful auxiliary to the exact measurement of the rate of consumption of gas by experimental meters is his one-twelfth of a cubic foot measure (or "bottle"), which was very soon copied in Germany, with slight modification to excuse a slender claim to originality. His aerorthometer passed through various forms without attaining a large measure of popularity; but there is no doubt that the principles incorporated in it will be utilized in the gas-testing apparatus of the future.

At various times, Harcourt held inquiries and sat as umpire in connection with the affairs of gas undertakings—*e.g.*, at Wrexham and at Waterford in 1873; at Cork and at Dublin in 1874; with reference to accidents to workmen at the Forfar and Glasgow gas-works; and to the explosion of gas in the Tottenham Court Road in 1880.

Harcourt took a wider interest in educational problems than his professorial duties called for; and he was never happier than when assisting in planning the curriculum or organizing the recreation of schools for both sexes. He shared with Arrhenius the honour of being the first recipient (*honoris causa*) of the degree of Doctor of Science from Oxford University—which until quite recent years made its "M.A." degree serve for those who had passed its examinations in science equally with those to whom it was strictly appropriate. He rarely lost touch with any of his old pupils, and was revered by them all for his careful supervision of their studies.

His academical associations never estranged him from the practical affairs of life, as witness his efforts, up to within a few weeks of his death, to encourage the consumption of gas coke in place of coal in household fires. He had an unrivalled precision of expression in writing, and a severely logical train of thought. Directly and indirectly the gas industry has owed much to him.

ELECTRICITY SUPPLY MEMORANDA.

IN the "Memoranda" last week, some notes appeared on the question of electricity supply in connection with the housing schemes. Those notes were based on certain pamphlets issued by the Electrical Development Association.

Electricity Supply to Artizan Dwellings.

This week there may be some enlargement of the discussion in view of information from another quarter. So much has happened since the end of 1915, that it had slipped our memory that the Brighton Electricity Department had in Corporation artizan dwellings made sixty installations, connecting a total of 400 lights, on fifteen house-services. But the fact is now recalled. The intelligence was given by Mr. James Cleary in an article that was published in the "Electrician" in December of the year named, and which article was the subject of comment on our part, and the comment the subject of a feeble reply by Mr. Cleary. We so describe the reply because the comment was largely directed to the extravagancies found in the article. Apparently, the war has toned-down Mr. Cleary's previous views; for writing lately in the same contemporary, he applies less vivid pigments in presenting his opinions upon the place of electricity in the housing schemes. He says that most of the housing schemes which are now in the making depend upon the application of electricity as an aid to success. We do not know whence he got the information to justify the application of the term "most;" but we are strongly of opinion that, when the facts come to be published, it will be found that "most" of the schemes will incorporate gas. There is, however, a little obscurity as to what Mr. Cleary is aiming at in his opening passages; but it seems from the wording that, in this matter of the application of electricity to small houses, mistakes have been made in the past, and it is essential that these mistakes should be avoided. This is a very sensible suggestion, and, being so, meets with the fullest approbation. Among the "mistakes" of the past has been one which some engineers are not going to repeat, and that is to dabble in the supply of electricity to small houses, and incur loss to their own undertakings. They are very wise; and more so now when every condition has undergone change—for the worse, so far as electricity supply to the houses of the working class is concerned. Mr. Cleary considers that, if the work of electrical installation is done during construction under the housing schemes, there will be such a considerable saving that it will "in large measure" compensate for the increased cost of materials and labour. While agreeing that it is better to do installation work during building operations, we know full well it will not "in large measure" provide the compensation Mr. Cleary predicts. And it is no use being so foolish as to hope that it will.

Redecoration and Revenue.

Mr. Cleary touches very lightly on the case for installing electricity in artizans' dwellings. From the consumers' and the suppliers' standpoints, the elements that are on offer for such a case are worse than ever they were.

And for these reasons: Costs to the suppliers are in every direction immensely greater than they were before, and so they must have a larger revenue and a larger margin of profit. The consumer, on the other hand, finds the price of supply considerably heavier than before. Lighting alone, such as suffices in the working man's house, will not furnish the required profit to the electricity purveyors; and it is more essential to-day than ever that the occupants of such houses shall get for their money a larger lighting and heating value than electricity can give them. Mr. Cleary (as four years ago) is strong on the saving that electricity is supposed to achieve in regard to redecoration, and gas in this respect should be judged from the modern, and not from the recollections of the ancient, aspect. However, the redecoration of artizans' dwellings is a matter for the landlord, and not for the tenant; and besides Mr. Cleary must go about with his eyes shut and his intelligence barred against fact, if he does not know that, in an artizan's or other house, health pleads for periodical redecoration. Commonsense, and not such nonsense as redecoration "promises to be well worth *avoiding* in the future on the score of cost alone, apart from the inconvenience," is what is required in dealing with the housing question. Redecoration cannot be "avoided" if cleanliness and healthy conditions are to be safeguarded. Why does Mr. Cleary wash himself, and why change his clothes? Is there no wear and tear going on in a house? Does paper never get dirty or faded? Is the air all filtered that enters a room? Is there nothing that adheres to walls and ceilings in rooms where people live and breathe? Do not let us go about our discussions with a childish pretence that the most elementary scientific facts are beyond our comprehension. Regarding the Brighton experience, there are in all sixty installations, with a total of 400 lights, or fifteen house-services. During the past five years, "the revenue has steadily increased, and now averages over £6 per annum [a total revenue of £90] for each house service laid on." That is to say, there being four installations on each service, the revenue from each installation is 30s. a year, or approximately 7d. per week! Is this all that the Department has obtained for capital, installation, and electricity costs, and lamp renewals during the war with charges rising in every direction? If so, we are of opinion that the tenants of the Corporation artizan dwellings have been served on preferential terms, compared with the large ordinary consumers for lighting. But why should we criticize this when "the economy of matches was very much appreciated by the tenants during the period of shortage?"

Subsidizing Municipal Trading.

During the debate on what is now the Profiteering Act, there was some fear expressed that local authorities who purchased and sold goods would unfairly compete with local tradesmen. In view of this, Col. W. Guinness secured the insertion of a clause ensuring that local authorities engaging in trading should proceed on a commercial basis, and not by way of subsidizing at the expense of the ratepayers. It was explained that the object was to prevent the subsidizing of unproductive experiments in municipal trading under the Bill. We should like to see this principle extended. Municipal electricity supply has been subsidized—not in all cases, but in many—from its very beginning; and recourse to subsidies is at high-water mark now. The exploiting of any commodity at the expense of the non-users is economically unsound; and particularly is it unjust to private enterprise in competition—such as gas companies. While Parliament is keen on reformation and reconstruction, it is to be hoped that it will make it illegal for municipal electricity undertakings to be run on these terms. If ratepayers have to temporarily come to the aid of an undertaking that, through no default of the administration, cannot one year make both ends meet, then the following year there should be an adjustment of the tariffs to a sufficient extent to allow of repayment to the ratepayers.

The Lure of the Countryside.

When Standing Committee B were discussing the powers of the Electricity Commissioners, there was very strong protest against any autocratic authority being conferred upon them which might compel electricity suppliers spreading their distribution arms into rural areas which would produce a loss and not a profit. The silly drivel to which politicians gave voice, and the newspapers space, as to what national electricity supply was going to do for farmers and the rustic cottager miles away from urban life, and therefore from the central supply areas, was shown-up in its proper light when practical men had the opportunity of handling it in Committee. The "Electrician" seems to have some solicitation for rural areas and a tendency towards speculation. In a recent issue, it said that, when the national electricity scheme develops, there should be good opportunities in rural districts for concerns which are strong enough to look to the future, and face only a small immediate return. But, unless the return is adequate to cover all outgoings, and continual depreciation, other people will have to make up the difference; that is certain. And the "other people" are the ones who are the backbone of the concern, and so should be the ones to receive the greatest consideration. One of the most important of the factors that keep an undertaking from making headway is unproductive expenditure. But our contemporary thinks the matter of rural supply should be taken in hand as soon as possible in the interests of British agriculture. We assume it means even at the risk of some depression of the interests of the electricity industry. It has had inspiration from what it has been reading of the trend of view in America regarding farm supplies; but the trend of view is probably that of the electricians, and not of the agriculturists themselves. It says there has been for some years a big demand for farm lighting outfits; but the opinion is gaining ground that such methods are not in the long run economical. Whose "view" is this? "As electrical undertakings develop, the tendency is for such outfits to be ultimately scrapped in favour of distributed supply. This involves an economic loss to the farmer especially as such plant becomes somewhat unsaleable when a public supply is available." Assuming the correctness of the argument, is it not better for the "economic loss" to fall upon the farmer than upon the electricity undertaking? Of course, if electricity undertakings are to be philanthropic institutions, there is nothing more to be said. One mistake that the administrators of electrical concerns make is to overlook the fact that the self-contained plant for electricity generation (which does not involve a large distribution system) has not been standing still in the matter of progressive efficiency. If, under certain conditions, a private electrical plant in a city or town can generate more economically than the electricity undertaking with cables passing the door can supply at [see the Stafford experiences noted in our editorial columns a fortnight since], then we can see no reason why private generating sets for the farmer should not generate more economically than electricity necessitating long transmission lines.

Puerile Electrical Criticism.

If there is one thing in which some electrical men are past-masters, it is postulation. In "World's Work" an interview with Mr. F. W. Goodenough has appeared —the subject of the conversation being the "Coal Crisis." The Government is loud in its moanings and groanings over the shortage of coal output; and it pleads on all hands for coal conservation. It shows its capacity for not seeing things in their true relationship by permitting the electricity industry to sell 1000 units of electricity for heating purposes as the equivalent of a ton of coal, while the average use of coal in this country for the production of 1000 units is about 2 tons. Not long since, it was promising electricity for heating to all and sundry, while seeking coal conservation, if only a national electricity scheme was carried out. Yet when the time comes, and the promised super-stations are in full swing (which they are not likely to be now for an unknown number of years), the best efficiency predicted, not assured, is round about 1 KW.-hour (3420 B.Th.U.) per 2 lbs. of coal, or (say) 27,000 B.Th.U.—the difference between the potential heating power of the unit and the coal being 23,580 B.Th.U. At present an average of 67,500 B.Th.U. are required to produce electrically 3420 B.Th.U. And so the Government advocates coal conservation on one hand and waste on the other. "Electrical Industries" does not dispute the claim of Mr. Goodenough that gas has substantial superiority over electricity as a heating agent; but it describes as "incandescent effrontery" an assertion that the balance —on the score of coal conservation—is in favour of gas also in providing light or mechanical energy. Mr. Goodenough's accuser, however, refrains from showing where the statement is wrong. If he takes the quantity of gas made from the coal put into the retorts, and then deducts per ton of coal the other commodities besides gas—coke, tar, &c.—which are produced through the carbonization of the coal, he will see what a small proportion of the coal is actually used in the making of gas. If he is hard up for a source for figures, he will find them in Mr. Cash's address to the proprietors of the Bournemouth Gas and Water Company as published by us last week—remembering that these figures are approximate, and subject to variation if the steaming process is practised, with which from (say) 16,000 to 20,000 c.ft. of gas are produced, *plus* the other commodities, for every ton of coal charged into the retort. If he will consider all the factors bearing upon the position, it ought not to be beyond his comprehension that "the balance—on the score of coal conservation—is in favour of gas also in providing light or mechanical energy." We may commend to his notice the daily practical experience with gas-engines in competition with electricity at Stafford, as published in our columns a fortnight ago. This experience runs through the country. Against it, the remark of the electrical writer that "the ghosts of gas-engines which once coughed through their brief inglorious lives on town gas must haunt Mr. Goodenough," is one which has the distinction of being very childish and silly.

Electrical Precipitation of Tar-Fog.

The current number of "Engineering" mentions as from a Canadian source—the "Transactions of the Canadian Mining Institute," 1918, pp. 252-58—a paper contributed by Mr. G. Davidson. It is pointed out that the removal of tar-fog from coal gas is a troublesome operation, but is very essential (for instance) in the direct ammonia process. According to Davidson's communication, the Cottrell process of electric precipitation is quite able to deal with the crude gases produced in the distillation of coal, wood, and petroleum, even at the high temperatures used in modern industrial processes; while the usual methods of tar-fog removal in extractors require the cooling of the gases. Davidson obtained cleaner distillates with electric precipitation than formerly. The treater chamber he used consisted of an iron pipe, 15 ft. high and 12 in. diameter, provided with fused quartz insulators. He passed about 1,000,000 c.ft. of gas per day through his heater, which requires some 2 or 3 H.P.

SCIENTIFIC AND INDUSTRIAL RESEARCH REPORT.

THE fourth annual report of the Committee of the Privy Council for Scientific and Industrial Research (for the year 1918-19) deals with the work accomplished during the year which witnessed the change from war to peace. The work as described falls into three main divisions—the progress made in the establishment of Research Associations, the organization of research for national purposes, and the developments that have taken place in the conduct of researches initiated either by other bodies or by individual workers. It is estimated that the number of Research Associations will ultimately be about forty.

As bearing upon what was stated on p. 439 of last week's issue of the "JOURNAL," attention may be drawn to the remarks again made in the report that unforeseen difficulties in obtaining the necessary material and labour, as well as in establishing the foundations, have added considerably both to the time and money required for the completion of the Fuel Research Station at East Greenwich. The laboratories are, however, already open, and have been at work for some time; while the main station will be finished in the autumn. The cost of the buildings and routine equipment is estimated by the Office of Works at £188,000; and in their estimates the Committee have provided a sum of £8000 for experimental plant during the current financial year. Acknowledgment is made of the fact that the Fuel Research Board have been greatly assisted in their plans—especially as regards research into fuel oil and the necessary plant for the purpose—by the active and sympathetic co-operation of the Admiralty.

The Advisory Council, after announcing the appointment of Engineer-Commander Fraser Shaw, R.N., to be Engineer-in-Chief of the Fuel Research Station, proceed:

> In view of the cessation of war conditions and of the recent developments in the coal mining industry, the Fuel Research Board feel it to be desirable that they should reconsider the whole outlook as regards their researches into the more economical use of the fuel resources of the nation. In a report which they propose to issue shortly, they intend to deal with this subject.

With regard to the work of the Board on Gas Standards undertaken at the request of the Board of Trade, the report remarks as follows:

> The work of the Board on Gas Standards undertaken at the request of the Board of Trade seems likely to usher in a new era in the relations of the consumers and the gas companies at the moment when the need for economy and efficiency in gas practice is more insistent than it has ever been since the industry was founded. It is particularly interesting to record in this connection that one of the largest and most progressive gas companies in the kingdom proposes to introduce private legislation immediately to enable it to adopt the procedure which the Director of Fuel Research [Sir George T. Beilby, F.R S.] has recommended. We are deeply indebted to him, not only for the scientific knowledge and investigation that he has brought to bear upon this problem, but also for the patience and skill with which he has explained his prosposals, and conducted negotiations with all the parties concerned.

The main considerations in the mind of the Board when reporting last March to the Board of Trade were the national importance of obtaining from the coal used by gas undertakings the largest possible proportion of the heat units it contains in the form of gas available for distribution to consumers, and the necessity of ensuring that the consumers should in future only be charged for thermal value actually received.

The First Lord of the Admiralty has asked the Department to establish a permanent organization for the study of the problems of power alcohol, in accordance with the recommendations of the Interdepartmental Committee under the chairmanship of the late Sir Boverton Redwood, whose report was noticed recently in the "JOURNAL." This work it is proposed to entrust to the Fuel Research Board.

The Gas Cylinders Committee will investigate the question of cylinders used for compressed gases; it being thought that a cylinder lighter than that required by existing regulations, and yet possessing the necessary factor of safety, might be produced.

Among other work, a grant-in-aid, subject to Treasury sanction, has been approved of £10,000, for the important work of the Industrial Fatigue Research Board during the current year.

The Advisory Council's report is divided into three parts—Industrial Research Associations; the increasing amount of research for national purposes; and work undertaken by independent institutions aided by the Department or by individual workers or research students to whom grants are made. Particular emphasis is laid on the urgent necessity for training research workers.

Eastern Counties Gas Managers' Association.—The autumn meeting of this Association will be held on Wednesday, the 1st prox. at Salisbury House, Finsbury Circus, E.C., at 2.30 p.m. The business to be transacted will include the induction of Mr. W. W. Townsend, of Colchester, as President for the coming year; papers by (1) Mr. S. Moore, of Scunthorpe, on "Coal Conservation and Water Gas," (2) "The Post-War Gas Manager," by Mr. C. E. Wright, of Ipswich; and a discussion on the "Coal Position."

ADVANTAGES OF GAS-FIRED AIR-HEATERS FOR THE EVAPORATION OF LIQUIDS.

AFTER instancing the extensive commercial application of evaporation to dryness in connection with milk, eggs, blood, sulphite liquor, alkali, waste, &c., Mr. Gilbert C. Shadwell refers, in the "Gas Record," to the costly apparatus and other incidental disadvantages of the vacuum process as at present generally used, and proceeds to describe a method that offers large all-round improvement. It is an advancement and modification of the fruit or vegetable drying apparatus that has lately come into use. The chief differences are that the gas-heating device is separate from the evaporating chamber, the use of an air-blast, and the means of bringing the fluid and heated air into contact.

A frame chamber is constructed with walls of burlap or other suitable material. The liquid is run into a trough fixed against one of the side walls at half the height, extending the whole width, and provided with an air-spraying device by which a thin sheet of spray is blown across the centre of the chamber. A narrow slit, extending the whole length of the front at the same level, admits a blast of air, in sufficient quantity at the necessary temperature, which strikes the spray at a right angle, vapourizing the liquid, and causing the solid to fall, as a fine powder that requires no further preparation, to a suitable receptacle at the base. An air-blower drives the blast first through a cylindrical gas heater, then through a fan spreader to the narrow slit. Complete dryness of residue, or concentration to any degree, can be secured by adjustment of temperature and quantity of air, or supply of liquid. The material does not come into contact with hot metal. The process may be extended to the drying of fruits or vegetables.

The construction is cheap and simple, and the lightness and ease of transport enable the drier to be located at any convenient spot close to the source of raw material. The cost of operation cleaning, adjustment, and maintenance is small, fewer operatives and less expert attention are required, the process is completed and the finished residue obtained at one operation, there is no scorching or injury to delicate substances, and the residue is uniform and soluble. The vacuum process requires costly and elaborate machinery, and includes several operations, such as concentrating in a vacuum pan, drying on a drum drier, collecting and powdering the residue, &c.

The results of exhaustive tests, including steam and gas-heated air, showed that with gas the useful heat for evaporation could be increased from 60·6 to 89 p.ct. The consumption of gas was 3 to 4 c.ft. per pound of liquid evaporated; and on the basis of equal money values, a greater quantity could be evaporated by gas, showing a decided fuel cost saving, apart from cheaper first cost and operation.

USES FOR GAS IN PENCIL FACTORIES.

Every pencil factory can use gas, Mr. Gilbert C. Shadwell tells the readers of the "American Gas Engineering Journal." Though oil and electricity are close competitors in some cases, gas can and should have the field. Mixing the clay and graphite for making blacklead pencils is a long, slow process; and when it is completed, the mixture is forced through dies, and then cut to pencil lengths, which are placed in a drying-room maintained at a suitable temperature. Though Mr. Shadwell knows of no instance in which a gas-fired air-heater is used for this part of the work, it seems to him to be the obvious equipment to offer, as it would undoubtedly speed up production. At the same time, the leads must not be dried in too great haste, as it tends to make them unduly brittle. When sufficiently dry, the leads are packed in crucible boxes and placed in a muffle-furnace, for tempering and toughening. This business legitimately belongs to the gas field. A temperature of about 2000° Fahr. is required to be maintained; and there are plenty of standard furnaces on the market to do this work. Again, the cedar wood for pencil making must be seasoned and kiln-dried to eliminate part of the oil it contains; and gas can very conveniently be used as the fuel for the purpose. The only thing necessary is a big flue to the kiln, so that there may be ample ventilation. The pencils are coated with colour and taken to a drying-room (for which there is no reason why a gas-fired air-heater should not be used); the operation being repeated from six to ten times. Finally, the steel die for stamping the pencils with gold or silver leaf may be heated by gas. For making indelible and copying pencils, the colouring matter is an aniline preparation mixed with clay and a certain kind of gum. This is heated together in a jacketed gas-heated cauldron furnace, at a temperature slightly below 200° Fahr., and mechanically agitated.

Output of Coal per Man in New Zealand.—In forty years the coal output per person employed underground in the mines of New Zealand has increased nearly 70 p.ct. The output per man in 1913 was 590 tons, in 1914 639 tons, in 1915 711 tons, in 1916 750 tons (the highest on record), in 1917 715 tons, and in 1918 703 tons.

GAS-WORKS POWER PLANTS.

JUDICIOUS MODERNIZATION.

By H. C. WIDLAKE, A.M.I.E.E.

Plymouth and Stonehouse Gaslight and Coke Company.

(*Continued from p.* 446.)

A side elevation of the exhauster set referred to last week is shown in fig. 7. It will be seen that the engine was of the old-fashioned vertical "table" type, of that massive and highly ornamental design so beloved of engine builders some fifty or sixty years ago; the date of the engine being 1868. In this engine the piston rod projected through the top cover of the cylinder, and there engaged with its crosshead, from which the drive to the crankshaft was taken by means of a pair of heavy side connecting rods terminating in a common big end under the cylinder table support.

This engine had a large driving pulley fitted alongside the fly-wheel, for the purpose of transmitting its motion, *viâ* a horizontal belt-drive, to the small driving pulley on the exhauster shaft. The capacity of this set was supposed to be 84,000 c.ft. of gas per hour; and while there was little doubt that the exhauster itself was capable of dealing with such a make, no attempt was ever made to run it under this load, owing to the tendency of the driving belt to leave its pulleys, and cause the engine to attain a dangerous speed before it could be checked. Candidly speaking, the entire installation (which was in duplicate) was obsolete, and had no place on a modern works. But the question of replacing it by modern plant had never seriously been considered, owing to the very real difficulty of changing exhausters in connection with plant running day and night.

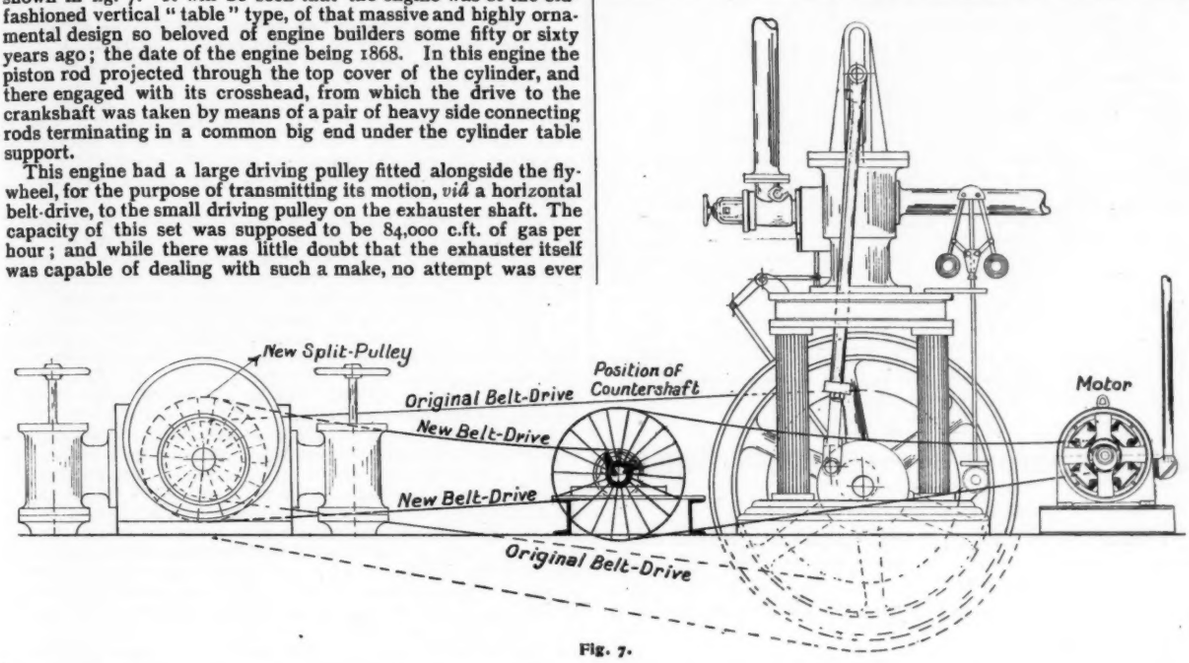


Fig. 7.

During the summer of 1917, serious defects had developed in the engine of one of the sets; and it was decided to abandon the engine and arrange to drive the exhauster by means of an electric motor. Unfortunately, this particular exhauster had a very bad reputation, and was known as being a brute to start—a gang of four or five men being often required to help the engine to break-centre when starting-up. For this reason the set was only run at such times as the load was in excess of the capacity of the other duplicate set. The defective engine itself was so massive, and the time available for the completion of the job in readiness for the winter load was so short, that it was decided to leave the engine in its place. Between the engine and the exhauster a short length of shafting was installed near the ground, on channels mounted on a concrete bed in such a manner that a 12 in. diameter by 12 in. face pulley mounted on the end took up its position between the top and bottom sides of the belt connecting the exhauster with the engine. This latter drive, luckily, had fairly long centres—a fact which largely contributed to the subsequent sweet running of the new arrangement.

The exhauster itself was capable of dealing with a make of 84,000 c.ft. per hour, at a speed of 75 R.P.M.; and in designing the new gear it was taken for granted that under the modern drive the machine would deal with this load. The pulley on the exhauster shaft had a face width of only 6 in., and there is little doubt that this weakness in design was largely responsible for the erratic behaviour of the set under heavy loads. This pulley was removed, and replaced with one having a 12 in. face and a diameter of 42 in., from which an 11-in. belt was taken over the 12-in. pulley on the end of the newly-installed countershaft. The length of this countershaft was such as allowed it to project about 15 in. beyond the side of the abandoned steam-engine—thus giving ample room for a belt-drive back to the electric motor installed behind the engine.

This job was put to work in September, 1917, and since then has run without a hitch. Apart from the fact that the quick installation of a motor enabled the water-gas plant to run at its full capacity throughout the winter, there has been a considerable saving of fuel, amounting to about three-quarters of a ton per twelve-hour day. Owing to the present night demand on the works' power plant, this exhauster is only run during the day; the night duty being taken by the steam-driven set installed alongside. We shall shortly be able to instal a motor for driving this set also; and it will then be possible to cut out of service about 200 ft. of 6-in. steam main, until which time it is impossible to estimate the ultimate saving which this modernization will likely bring about.

In spite of the fact that the exhauster always behaved very badly in respect to starting under the old steam drive, there is not the slightest trouble in this respect now, and the entire machine runs sweeter in every way—due, in all probability, to the extremely even turning effect of the motor as compared with the conditions that previously existed in respect to a machine having in itself a cyclical irregularity being driven by a power motor which was incapable of providing a steady turning moment. These two factors doubtlessly combined in such a manner as to bring about an extremely jerky drive, which not only constantly threw the 6 in. belt off, but reacted unfavourably upon the condition of the exhauster. This machine is now quite capable of handling the full output for which it was designed, and does not jib at a 25 p.ct. overload.

A particularly interesting feature of this installation is the manner in which the question of speed variation was overcome. The only motor available for the work was an old 15 B.H.P. shunt-wound Crompton, built for a constant speed of 750 R.P.M. The general design of the machine, however, was such as it readily gave about 30 p.ct. speed increase by shunt-regulation. During the summer, the minimum load on this exhauster was about 20,000 c.ft. per hour, and the maximum load about 40,000 c.ft. Towards the end of the summer these figures would be increased by about 50 p.ct., while in the winter season the minimum load would be 60,000 c.ft. and the maximum 90,000 c.ft.

Apart from the fact that it was impossible to get a motor of the variable speed type, the high cost of a machine capable of 1 to 5 speed variation by shunt-regulation was such as to warrant the trouble taken to make do with the existing (practically) constant-speed machine. Before installing the motor, it was run under an artificial load, and was found to be capable of yielding a 30 to 40 p.ct. increase of speed by shunt-regulation without any hunting or commutation troubles setting-up. It was further found that, by the use of a series-regulator connected in the armature circuit, it was possible to reduce the normal speed of 750 R.P.M. down to 400 R.P.M.

It will be observed that, by the use of a shunt-regulator for speeding-up, and a series-regulator for reducing the speed, this motor became practically a variable-speed machine capable of running at any speed between 400 and 1000 R.P.M. Of course, at speeds below 750 R.P.M. it was not capable of exerting full load torque; and, further, any reduction of speed below this figure was obtained at the cost of rheostatic losses. But neither of these factors was in this case sufficiently formidable to constitute any serious objection to the regulation of the machine by such methods. The motor was installed on a pair of long slide rails to facilitate belt adjustments; and a set of four pulleys—respectively 9 in., 12 in., 14 in., and 16 in. diameter—were obtained for use at different seasons of the year, and were changed according to the variations in the make.

A table has been prepared showing the wide range of exhauster speeds obtainable by the use of these different diameter pulleys. It will be noticed that only three speeds are shown against each pulley; but it will be readily understood that there would be about 13 different speeds between the slow and the medium speeds (obtainable by series-regulation), and about 28 different

speeds between medium and full speeds (obtainable by shunt regulation). The requisite range of exhauster speeds could be obtained by the use of only two pulleys. But this would involve a lot of running on the series regulator; and in order to avoid this as far as possible four different pulleys are kept—the change being made about four times a year, necessitating a delay of about ten minutes.

Table Showing Range of Exhauster Speeds.

Diameter of Motor Pulley.	Method of Regulation.		Speed of Motor.	Speed of Exhauster.
	Series Resistance.	Shunt Resistance.		
9 in.	All in	All out	400	21
	All out	All out	750	40
	All out	All in	1000	53
12 in.	All in	All out	400	28
	All out	All out	750	53
	All out	All in	1000	71
14 in.	All in	All out	400	33
	All out	All out	750	62
	All out	All in	1000	83
16 in.	All in	All out	400	38
	All out	All out	750	71
	All out	All in	1000	95

NOTE.—The normal speed of the motor was 750 R.P.M.; and this speed is obtained when both the series and shunt resistances are short-circuited.

(To be continued.)

COAL TRANSPORT REORGANIZATION SCHEME.

Board of Trade Announcement.

With a view to assisting in the restoration of normal conditions, it has been decided that the restrictions imposed on the transport of coal by rail under the Coal Transport Reorganization Scheme shall be suspended as from the 1st of September until further notice.

In order to give effect to this decision, a general permit has been issued; and it will not be necessary until further notice to apply for permits in individual cases after the above date.

It is to be observed that this decision does not affect the instructions at present in force to suppliers of coal as to the maintenance of supplies to their existing customers.

COMPOSITION AND CLASSIFICATION OF COALS.

Investigations by the United States Bureau of Mines on the subject of the composition and classification of domestic coals are the subject of an article by Mr. A. C. Fieldner, of Pittsburgh, in the pages of the "Gas Age." He points out that from the ultimate analysis (resolving coal into its chemical elements), it is possible to calculate roughly the heating value of a coal. However, this method is no longer used, as an actual test in a calorimeter is more accurate and much simpler. The Bureau of Mines have a special multiple calorimeter installation in which six samples can be tested at one time, with an accuracy of 0·1 p.ct. In recent years, fuel engineers have demanded a test of the fusing temperature of the ash, in order to get some idea of its clinkering tendencies. This test is made by moulding some of the finely ground ash with the aid of an organic binder into small triangular pyramids, and heating them slowly in a furnace until the ash melts. The furnace used in the Bureau of Mines laboratory is operated with an excess of gas burning at the vent, in order to maintain a reducing atmosphere in the combustion chamber. Under these conditions, the iron in the ash is reduced to the ferrous state, which gives the lowest melting-point, and therefore the lowest temperature at which clinkering may result. Experience shows that the average softening temperature of the ash of the different coal-beds of America ranges from 1900° to 3100° Fahr. With the establishment of the United States fuel-testing plant at St. Louis, in 1904, the Federal Government began an analysis of coal from various parts of the country by uniform and standardized methods. On the basis of these comprehensive and uniformly-made analyses, and also the physical characteristics, the Geological Survey have worked out a scheme of classifying coal according to its rank. The word "rank" is here used to designate those differences in coal that are due to the progressive change from lignite to anthracite—a change marked by the loss of moisture, of oxygen, and of volatile matter. When, however, one coal is distinguished from another by the amount of ash or sulphur it contains, this difference is said to be one of grade.

Gas (Use in Motor Vehicles) Order Cancelled.—Pursuant to the provisions of the Articles of Commerce (Relaxation of Restrictions) Order, 1918, the Board of Trade duly gave notice that the Gas (Use in Motor Vehicles) Local Prohibition Order, 1918, would cease to have effect as from the 18th ult.

THE "CARBOCOAL" PROCESS.

In yesterday's issue of the "Daily Telegraph," the Engineering Correspondent had a two-column article on "Coal Carbonization—Saving the Products," in which, after drawing attention to low-temperature systems in general, he gives the following account of the "Carbocoal" process—already referred to on several occasions in the pages of the "JOURNAL."

Within the past three or four years, a new process, involving a two-stage carbonization, has been developed in America as the result of an elaborate series of experiments conducted at Irvington, New Jersey, and carried on under the direction of Mr. Chas. H. Smith, a member of the American Institute of Mining Engineers. The process yields a smokeless fuel from high volatile coals, and includes also the recovery and refining of the coal-tar products. An essential feature of the process is that it involves carbonization in two distinct stages, each with a very definite object.

In the first stage, the raw coal, after being crushed, is distilled at the relatively low temperature of 850° to 900° Fahr. This primary distillation is accompanied by constant agitation of the charge; this being effected by paddles, which also move the charge through the furnace. A uniform distillation is thus ensured; and the permitted partial carbonization occupies a period of one to two hours. The products of primary distillation include gas, tar, and a solid residue rich in carbon—termed "Semi-Carbocoal." The yield of gas is stated to be from 5000 to 6000 c.ft. of 650 to 700 B.Th.U. per cubic foot. The tar amounts to about 14 to 16 Imperial gallons per ton of coal.

The solid product—semi-carbocoal—discharged from the low-temperature retorts is mixed with pitch obtained from the tar distillation in the proportion of about 7 p.ct., and the mixture briquetted. The briquettes are now subjected to the "secondary" distillation at a much higher temperature—viz., from 1800° to 2000° Fahr. During this distillation, a further volume of gas (about 4000 c.ft., of 350 to 400 B.Th.U. per c.ft.) is recovered, and with it a small proportion of tar—about 4 to 6 gallons per ton of fuel. Whereas, however, only a low yield of ammonium sulphate results from the primary distillation, the yield in the second stage is much higher; bringing the total recovery to 20 to 24 lbs. per ton. During the second distillation, all evidence of pitch as an ingredient disappears. The briquettes shrink, correspondingly increasing in density; but they retain their shape, and represent about 72 p.ct. of the weight of the raw coal—the exact figure depending upon the volatile content of the coal. This solid product is called "carbocoal." It is dense, clean, uniform in size and quality, and may be readily handled and transported for long distances without undergoing disintegration. It is manufactured in briquette form in sizes from 1 to 5 oz. For domestic purposes, the smaller sizes are used. Its combustion is not attended by the production of clinker; the briquettes being gradually reduced in size during combustion. Carbocoal shows the following analysis averaged from a wide range of coals:

—	From Run of Mine.	From Washed Coal.
	P.Ct.	P.Ct.
Moisture	1·00 to 3·00	1·00 to 3·00
Volatile matter	0·75 ,, 3·50	0·75 ,, 3·50
Fixed carbon	82·00 ,, 88·00	85·00 ,, 90·00
Ash	8·50 ,, 12·00	7·00 ,, 10·00
Sulphur	0·50 ,, 1·50	0·60 ,, 1·50

As a devolatilized fuel it has a high rate of combustion, and is thus suited to steam raising for locomotive, marine, and general purposes. It has been tested by the Long Island Railroad, by the Pennsylvania Railroad, by the Clinchfield and Ohio Railroad; and the United States Navy, after investigating the process, built a plant at Clinchfield, Virginia. As a consequence of its smokelessness, it is suited for use under stationary boilers, furnaces, stoves, range and open grates, in kilns and drying ovens, in metallurgical furnaces, and in gas-producers.

Brief reference has already been made to the gas and tar. The total yield of gas is of the order of 9000 c.ft. of about 530 B.Th.U. per c.ft. per ton of coal. As at present conducted, the whole of the gas is used in the process. Further reports will be awaited with interest to determine whether the utilization of the gas provides the most economic source of heat for the various operations which constitute the process. The semi-carbocoal—the intermediate product—offers possibilities for the production of power gas; and as it contains nearly the whole of the nitrogen content of the original fuel, it provides scope for ammonia recovery. Normally the total yield of ammonium sulphate is about 21 lbs. per ton of fuel.

Passing now to the tar, this constitutes a feature of all controlled carbonization processes. By the "Smith" carbocoal process, the yield of water-free tar is 20 gallons per ton of fuel, containing 35 p.ct. of volatile matter. In the first distillation, 14 to 16 gallons are obtained; these figures including the light oil obtained by stripping the gas. This low-temperature tar contains 70 p.ct. of tar oils and 30 p.ct. pitch. The higher temperature dislation yields 4 to 6 gallons of tar per ton, and is in many respects

similar to that obtained from coke-ovens. It is heavier than the primary tar. For commercial purposes, the two tars are mixed prior to fractional distillation; but the difference in composition is shown in the following table, in which a comparison with coke-oven tar is made:

—	Distillation Temp. ° Fahr.	Coke Oven Tar. Gallons.	Primary Carbocoal. Gallons.	Secondary Distillation. Gallons.
Light oil	Up to 170	0·18	1·06	0·002
Middle oil	170-230	0·30	2·20	0·024
Creosote oil	230-270	0·52	2·08	0·084
Heavy oil	270-360	0·84	5·92	1·656
Pitch	..	3·10	4·60	2·194
Loss	..	0·06	0·14	0·040
Totals	..	5·00	16·00	4·000

Of these products, the whole of the pitch is utilized for briquetting the semi-carbocoal, and any valuable constituents of the pitch are recovered in the second distillation. Thus practically the whole of the tar products obtained in the process are oil derivatives. Large quantities of oils are thus rendered available from the fuel, in addition to producing a solid smokeless residue of seemingly wide applicability; and a method of distillation admits of the recovery of benzol and toluol and motor spirit in the proportions of 0·16, 0·33, and 0·66 per gallon per ton. This combined low and high temperature distillation marks a definitely new step in coal carbonization; and while the tests above described have been carried out on a plant of commercial capacity, considerable interest will attach to the extension of the process and to the economic aspects of which data are not at present available. A special feature of the process is that the dense product carbocoal is obtained from non-caking coals; the resinous constituents of the pitch used in briquetting effecting this solidification.

For such a process, and for others conducted on similar lines, there would appear to be a large future. The production of gas for general purposes and coke for special metallurgical purposes has for a long time been adequately catered for. In neither case, however, is the yield of tar, nor its character, such as will guarantee to the country an increasing supply of the oils in demand for steam-raising purposes, for which oils we are almost entirely dependent upon distant supplies. The increased home production of such oils is a matter of paramount importance to the nation. The results of the boring operations for petroleum in Derbyshire are by no means very encouraging as offering anything like the quantity of oil necessary to meet the rapidly-increasing demands of (say) the automobile and aeronautical industries. Even assuming that success beyond present indications attends the project, the oils thus available will provide only a tithe of the country's needs. The distillation of shale in increased quantities opens up another source of oil.

Along any one of these paths to increased oil production the immediate future demands cannot reasonably be met. The place and importance of oil as a most portable form of energy in industry is now being recognized. Prophecies of progress cannot be dated too far ahead. The oil problem, which became very acute during the war, is one which may be solved by the application of all the known methods of treatment of home raw materials, but which may not stand to be solved in the near future along any single one of the lines indicated above. The recovery of oil from fuels plays an important part, too, in fuel economy and conservation. Decreased output is the order of the day; and we must needs utilize to the full rather than any longer waste the coal to which we have access. The lessons of the war must be applied in order to secure industrial success. As regards coal, economic use is a more important factor than increased output for wasteful consumption. As a matter of immediate expediency, the export of coal from our shores may be desirable. The export (nearly 90,000,000 tons) arrests attention and stimulates thought. An effective carbonization of the coal prior to export would secure to the nation quantities of oil, which would go, at any rate, some way towards making good the naturally anticipated decrease in imports of oil from America. In that country the development of the automobile is so rapid that the near future may see the demand for light petroleum products so large as seriously to interfere with the exportation of such oil to this country. Alternative sources must be investigated and rendered available before it is too late. Interest in the whole problem as one of more than ordinary national importance should be more widely in evidence. The country's consumption of coal exceeds four tons per head per annum; and a proportionate sense of responsibility should be felt with regard to its economic use and conservation. While other efforts are being made to tap natural sources of energy in this country, we must needs for a long time continue to look to coal as our main store of energy. Its products are as numerous as they are valuable. Power, heat, light, fertilizers, and a wide variety of oils lead the way in an almost endless procession of coal products, and their hundreds of derivatives—including dyes, explosives, perfumes, disinfectants, pharmaceutical and photographic materials, and saccharin—through which we are at once put into close touch with numerous industries. The pinch of the fuel problem during the war and the effect on industry and production of the present shortage of coal must impress lessons of incalculable value towards the safeguarding of national interests of a profound character.

THE PHOTOMETRIC SCALE.

During the past few years, a complete photometric scale—the term being used to include, in reference to photometry, the same kind of collection of constants, fixed points, methods, &c., as, in reference to thermometry, go to establish and maintain the thermometric or temperature scale—has been established and published by Dr. Herbert E. Ives during the past few years. Such a scale, he says, rationally based, and adequately specified, is necessary in any branch of exact science, to ensure agreement of results among different workers, and to give their results scientific and practical value when obtained. The scale that has recently been prepared by him involves the following factors: Conditions of observation; method of choosing observers; relative luminous values of radiant energy of various wave-lengths; the value of the lumen in terms of the watt of luminous flux; standards of luminous intensity; and standards of colour difference. These factors have been interchecked until complete agreement and consistency have been obtained—which he remarks is an essential procedure if photometric methods are to be used in accurate scientific work. As the scale now stands, it provides complete and practical means for the precise measurement of the luminous values of all kinds of light sources. In the interval of years since its first publication, additional data have been collected, which now make it possible to fix the constants of the scale with somewhat greater exactness. To the August number of the "Journal of the Franklin Institute of the State of Pennsylvania," published in Philadelphia, Dr. Ives contributed an article in which he set forth all the recommendations and data which constitute this scale—bringing them completely up to date.

INDIA AND BYE-PRODUCTS RECOVERY.

Dr. J. J. Sudborough and Dr. J. L. Simonsen, writing in the "Indian Munitions Board Industrial Handbook" for 1919 on the chemical industries of India, say the importance of coal tar in any development of the "fine chemical" industries is obvious; and the possibility of any such development in India depends on the amounts of coal tar available in the country, and also on the richness of Indian tars in the important constituents from which certain valuable chemicals are manufactured.

At the present time, the quantity of coke being made in India is approximately 520,000 tons per annum, yielding about 8000 tons of tar.* Assuming that the content of benzene, toluene, and phenol is the same as in European tar, this would yield approximately per annum 22,000 gallons of crude benzol (benzene and toluene) and 6500 gallons of carbolic acid.

The introduction of scrubbing plant for recovering benzene and toluene from the coke-oven gases might yield, in addition, 2,000,000 gallons of crude benzole. An examination of coal tar from Indian coals has further proved them to be relatively poor in phenols, so that the figures given are probably too high.

A comparison of some of these figures with the corresponding figures for Great Britain and America are of interest. In Great Britain, in 1916, 14,500,000 tons of coal were coked in bye-product coking plants, and in America, in 1915, 20 million tons were coked in bye-product ovens and 42 millions in beehive ovens. The output of benzol (crude benzene) in the United States of America in 1914 is stated to have been 4,500,000 gallons; and this had risen to 40,000,000 gallons by 1917.

It is clear that the amounts of tar available in India under present conditions are quite insufficient to start a large coal-tar industry. It therefore appears that the only method by which the coal-tar industry could be developed in India would be to coke at the pit-head all suitable Indian coal, and to send the tar, and also the oils recovered from the oven gases, to a central refinery. Such a scheme would have the advantage of diminishing the smoke nuisance caused by the burning of coal; but at present this nuisance is not so prominent in India as in Western countries. Large quantities of combustible gas and of ammonia would also be produced. The former could probably be used for the generation of electric power on a large scale, and the ammonia would be converted into sulphate. In most countries the ammonium sulphate thus obtained would be used as a fertilizer; but as India already exports 2000 tons out of 3000 tons of ammonium sulphate now manufactured, the question of the disposal of much larger quantities of sulphate needs careful consideration.

* All this tar is not manufactured in bye-product recovery plants. If this were done, approximately 16,000 tons of tar would become available, since 1000 tons of Indian coal are said to yield about 21·4 tons of tar.

It is announced that His Majesty King Alexander of Greece has consented to open the Exhibition of British Manufactures which has been organized by the Federation of British Industries in Athens. The exact date that will fit in with His Majesty's engagements is not yet known; but it is expected that it will be Sunday, Oct. 19. This will be the public "gala" opening; but the exhibits will be arranged and the exhibition open to trade visitors on the date already fixed, Oct. 13—Oct. 1, O.S.

REGISTER OF PATENTS.

Treating Liquor from Gas-Purifying Plants.
No. 128,401.

HOLMES, D. M., of Stockton-on-Tees.

No. 10,208; June 20, 1918.

In plants for purifying gases from producers, the patentee remarks, the major part of the ammonia in the liquor is in the form of ammonium chloride, and the ammonia is recovered by distilling the liquor with lime—an operation "unsatisfactory because it is costly in steam, and there is left an effluent which is dark coloured and offensive, so that there is difficulty in disposing of it." By the present invention, the recovery of the ammonia is so conducted that the effluent is sufficiently concentrated to permit of its introduction into the producer without ill-effect on its operation.

For this purpose the liquor is first run into an evaporator, where it is concentrated to about one-quarter (or less) of its bulk. It is then mixed with lime and distilled until a considerable proportion—say, 75 p.ct.—of the ammonia has been recovered, whereupon the residual liquor is run into the producer, where the rest of the ammonia is expelled and passes into the gases, while the organic matter is destroyed. In a producer having a water-lute, the calcium chloride eventually collects in the water. The liquor thus formed may be treated with nitre cake, or other form of sodium sulphate, to produce calcium sulphate and sodium chloride. The solution of the latter is sufficiently clean for disposal as an effluent, or it may be evaporated for producing salt suitable for agricultural use.

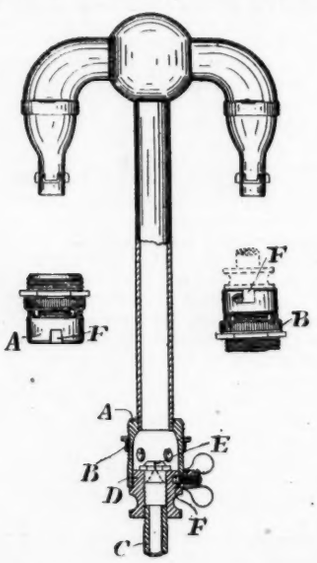
The liquor from the first washing vessel in a producer plant generally (having a temperature of about 90° C., and therefore containing practically no free ammonia) is run off in accordance with normal practice when its specific gravity is about 8° Tw. Instead of being passed to an ammonia still, the liquor is run into an open pan, through which it passes in a sinuous course from inlet to outlet. The pan being suitably heated, the liquor is concentrated to about one-quarter of its original bulk by this passage through the pan. The concentrated liquor is pumped into a still at a suitable elevation, where it is mixed with about the proportion of quicklime which would be necessary to expel the whole of the ammonia, and live steam is introduced until rapid distillation of ammonia ceases. Some 75 to 80 p.ct. of the ammonia is thus recovered very quickly, whereupon the contents of the still are run by gravity into the top of the producer. Here the rest of the ammonia is rapidly evolved and recovered in the washer. The ammonia from the still is either condensed to form ammonia solution or passed to a saturator in the ordinary manner.

Incandescent Gas-Burners.—No. 130,271.

REGAN, J. E., of Herne Hill, S.E.

No. 2122; Jan. 28, 1919.

This invention relates to burners of the type wherein the air supply is regulated by a screw-threaded ring (arranged on a threaded part) in which air-holes are provided. The invention is especially applicable to burners employed for open-air lighting—such as road or railway station lamps, especially when provided with high-pressure gas.



Regan's Incandescent Gas-Burner.

The illustration shows a side view of a double-mantle inverted burner with the nipple and mixing chamber in section; a side elevation of the mixing chamber detached from the burner, and showing the slotted recess and the air regulating means; and the angular slot of the sleeve when the invention is employed with a depending gas-pipe.

In the former arrangement, the leg of the T piece has branches from which depend the mantle holders, and a sleeve A, forming the mixing chamber, firmly attached to the leg by a threaded joint. The mixing chamber with its air holes is fitted with an air regulating ring B and a locking ring or nut. On the extremity of the gas supply pipe C is the nipple support provided with a plain cylindrical barrel portion, from which protrudes a rigid threaded pin, upon which works a butterfly nut which (when screwed up tightly) secures the barrel D within the sleeve. By one turn of the nut the sleeve and upper part are instantaneously removed from the support D, and may be held in one hand while the pin hole E of the gas-jet is cleared with the other hand and replaced after a few seconds.

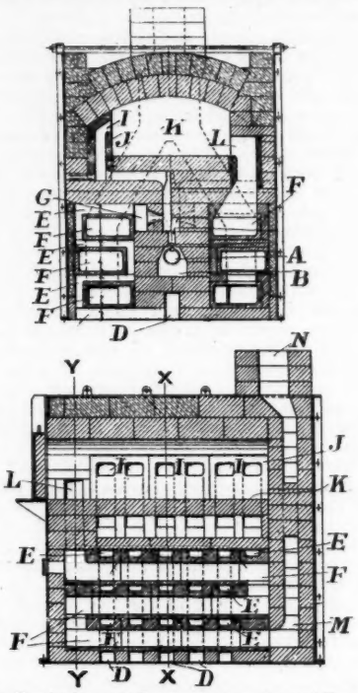
In the modification shown, there is a slot for use as an extra safeguard when the air-chamber supports a downwardly extending mantle device—the sleeves being rotated in this case until the pin occupies part of the slot F, in which position the nut is tightened.

Gas-Heated Furnaces.—No. 130,274.

KING, TAUDEVIN, AND GREGSON, LTD., GREGSON, W., and KING, J., of Sheffield.

No. 2543; Feb. 1, 1919.

This furnace is of the type in which the waste gases pass from the combustion chamber along zig-zagging superimposed longitudinal flues composed of hollow bricks, and heat secondary air passing through flues formed transversely over the top and up the sides of the flues—the transverse flues being in some cases formed by grooves in the top and bottom of the hollow blocks constituting the waste-gas flues.



King, Taudevin, and Gregson's Gas-Heated Furnace.

A transverse sectional elevation is given of a furnace built according to the invention; the left-hand portion being taken on the line X of the sectional elevation, and the right-hand portion on the line Y.

A represents the gas supply pipe with a series of jets or nozzles controlled by one common tap [not shown]. The pipe A is housed in a chamber B, and is supported in the end walls of the furnace. Air enters by the central longitudinal inlet D, and passes by several ports on each side to tortuous passages E around waste-gas conduits F. The passages E are formed by grooves up one side and along the top of the hollow bricks constituting the conduits F. The possibility of air short-circuiting to these conduits is precluded by forming a tongue-and-groove connection between the meeting faces of the bricks, or by the insertion of clay filling within coinciding grooves formed in each end face.

The air, after zig-zagging around the conduits F, enters longitudinal flues G, from which run off a series of nozzles, by which means the air (which has now attained a very considerable temperature) is delivered immediately over the gas-ports.

The mixture of gas and preheated air readily ignite and rise to vertical side flues I formed in specially constructed refractory blocks J, as described in patent No. 125,258. From these flues the products of combustion enter the heating chamber K, and circulate among the articles to be heated, after which the gases pass away by outlets L at each side of the furnace at the front and on a level with the floor of the heating chamber. From the outlets the waste gases pass downward by flues into the uppermost conduit F, along which they traverse longitudinally and pass downward to the next flue, and so on, until the lowest one is reached, whence the gases pass by uptakes M to the chimney N.

Separating Oils and Pitch from Tar.—No. 130,362.

LESSING, R., of High Holborn, W.C.

No. 1635; Jan. 28, 1918.

The patentee states that his investigations have led him to the conclusion that coal tar and like tars are considerably altered in composition during the process of distillation, wherein the temperature must be

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Suppliers of Benzol Washing Oil.

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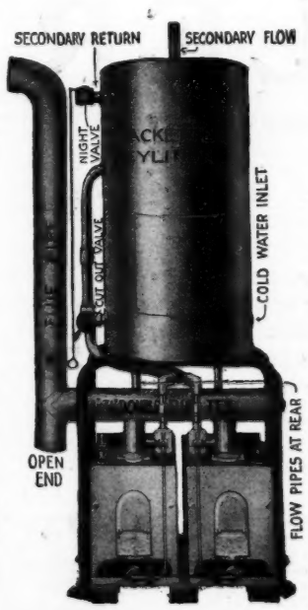

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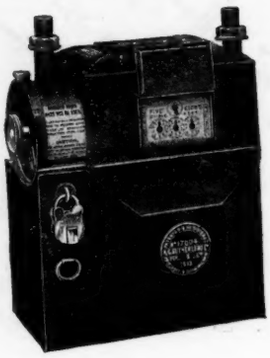

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raised fairly high since the boiling points of the oils range up to 350° C., and higher if the production of hard pitch is an object, and the temperature of the mass in the still is considerably in excess of this.

He has, therefore, sought to separate oils and pitch from coal tar or other mixture thereof by a process having no effect on the composition of the constituents of the tar, or an effect less than that of the heat applied in the ordinary distillation, and whereby the constituents may be obtained substantially of the composition that they had when mixed together in the original tar, in the hope that more liquid oils and a more valuable pitch would be obtained than are produced by distillation.

It has long been known, he points out, that by mixing coal tar with solvents—more particularly of paraffinoid constitution—a precipitation of pitch occurs; the oils contained in the original tar remaining dissolved in the solvent. His attempts to apply this mode of separation as a practicable process did not succeed, mainly because the precipitated solid pitch retained oil which was thus removed from attack by the solvent and imparted such a degree of toughness to the precipitate as to interfere seriously with the mixing operation. This trouble was not overcome by performing the mixing operation at a temperature not exceeding 50° C., as has been recommended as a means of facilitating the mixing, since at this temperature the pitch remains solid. He has found, however, that when the temperature of the tar is maintained above that at which the pitch to be obtained melts, complete separation of oil and pitch becomes a practicable operation.

His present invention therefore consists in treating coal tar (preferably free from benzol, toluol, and solvent naphtha) at a temperature above that at which the pitch to be obtained melts, with certain solvents—more particularly of a non-aromatic constitution, and especially petroleum distillates, consisting mainly of hydrocarbons of the paraffin or naphthalene series. When a petroleum spirit, for instance, is used with coal tar, the portion which is insoluble in the spirit constitutes a more or less hard pitch, and the portion which dissolves is left (after the petroleum spirit has been removed by distillation) in the form of an oil, normally of red colour, liquid at ordinary temperature, and of low viscosity—containing very little crystalline solid matter, such as naphthalene or anthracene. It is miscible readily with petroleum oils of any kind.

Coal tar can thus be separated into pitch and oils, in proportion which may be varied, by operating at a temperature at which the whole mass remains sufficiently liquid to permit thorough intermixture with the solvent. The patentee prefers to use a solvent the bulk of which boils under the pressure employed at a temperature above the melting point of the pitch produced in the process. For example, the tar, having been dehydrated to free it from liquor and the benzol and naphtha fractions, is stirred with petroleum spirit at a temperature slightly below the boiling point of the latter. The mixture separates into a lower layer of pitch sufficiently liquid to be run off from the vessel and an upper layer of a solution of oil in the spirit, which solution may be distilled for the recovery of the spirit and the isolation of the oil.

To use the solvent in a continuous cycle, the coal tar may be charged into a vessel having a stirrer, suitable heating devices, and a pipe for delivering the solvent into the lower part of the charge from a reflux condenser. An overflow from the vessel permits the solution containing the oil to pass to a still, the vapour from which is delivered to the reflux condenser, whence the condensed vapour flows back into the charge of tar as described.

By withdrawing pitch continuously from the bottom of the vessel and oil from the still, while permitting tar to flow at a corresponding rate into the vessel, continuity of the process can be attained. When, on the other hand, the process is conducted intermittently, the progress of the saturation of each batch can be followed by the rise of viscosity of the resultant pitch and the consequent increase of power consumed in stirring.

Removing Carbon Monoxide from Gas.—No. 130,383.

SOUTH METROPOLITAN GAS COMPANY and SOMERVILLE, J. M., of Old Kent Road, S.E.

No. 2239; Feb. 7, 1918.

The specification of this invention states: Heated caustic soda as a substance for absorbing or fixing carbon monoxide is a troublesome material in practice for several reasons, chief among which are that caustic soda is a highly deliquescent substance, and that it is not particularly efficient at temperatures below its fusing point. By the present invention, a material more easily used than caustic soda for removing carbon monoxide from gases is made by mixing asbestos with fused caustic soda in such proportion that the fused alkali is absorbed by the asbestos, so as to produce an apparently homogeneous pasty mass. On cooling, the mixture becomes a hard, dry mass which deliquesces only slightly, and, when broken-up, forms a material suitable for being heated in a pipe or vessel to the temperature at which caustic soda is most efficient in fixing carbon monoxide, without liquefaction. The best procedure known to the patentees consists in melting in a suitable vessel 2·2 parts by weight of commercial caustic soda, and continuing to heat until the temperature of the mass is about 700° Fahr., whereupon there is added by degrees 0·8 part of subdivided asbestos—preferably in the form known as asbestos wool. When absorption appears complete, the pasty mass is allowed to cool in a tray or the like, and the solidified mass is broken up into pieces of about the size of a pea, which are preferably sifted from dust. When heated at a temperature of 680° to 700° Fahr., the material readily removes carbon monoxide from gases—for instance, from water gas.

The Padiham District Council have increased the salary of the Gas Engineer (Mr. A. F. Ames) £50 a year; and they have also raised the price of gas 4d. per 1000 c.ft.

At Brechin, the Town Clerk has been instructed by the Council to ask the Gas Company on what basis they sought to increase the price of gas 10d. per 1000 c.ft. It was stated that in Forfar the price was 3s. 9d., while in Brechin it is now 6s. 3d. In other towns similar to Brechin, the increased rates varied from 4d. to 6d. per 1000 c.ft.

MISCELLANEOUS NEWS.

SULPHATE OF AMMONIA PRICES.

Maximum Rates Fixed for October to May.

The Board of Agriculture have come to an agreement with the makers of sulphate of ammonia with regard to the maximum prices to be charged for home agricultural use for delivery in the eight months October to May. The prices, it is seen, are appreciably higher than those ruling during last season, owing to the fact that the Government subsidy given to makers during the war has now been withdrawn. The particulars are extracted from a circular-letter issued by the Sulphate of Ammonia Association to Fertilizer Mixers, Agricultural Merchants, and Co-Operative Societies. The letter is in the following terms:

After consultation with the Board of Agriculture and Fisheries, we are now able to announce prices for sulphate of ammonia for home agricultural use for the months October to May, 1919-20.

(*a*) Orders should be sent in not later than Sept. 15

(1) for October/November/December delivery in equal monthly quantities;

(2) for January/February/March/April delivery in equal monthly quantities.

The two periods should be kept separate. Applications for May delivery should be sent in by March 31, 1920.

(*b*) All orders for quantities of 4 tons and upwards for consumption in England and Wales, Scotland, Isle of Man, and the Channel Islands should be sent to the Secretary, Sulphate of Ammonia Association, 84, Horseferry Road, Westminster, S.W. 1, and not to individual makers. But we shall be glad if you will kindly indicate the names of the makers by whom you wish to be supplied, if you have any preference. We are prepared to receive orders for lots of less than 4 tons if local supplies are not available. A special circular will be issued with regard to Ireland.

(*c*) For delivery as follows, the prices are:

October, 1919	£20 10 0 per ton	Delivered to consumer's nearest station or wharf in Great Britain for prompt cash payment.
November .	£20 15 0 ,, ,,	
December .	£21 0 0 ,, ,,	
January, 1920	£21 7 6 ,, ,,	
February .	£21 15 0 ,, ,,	
March, April, May	£22 0 0 ,, ,,	

The above prices are for 24½ p.ct. ammonia and will be increased by 4s. per ton for each complete 0·25 p.ct. ammonia over 24½ p.ct., and by a further 5s. per ton if sellers guarantee the free acid not to exceed 0·025 p.ct.; and should be reduced by 4s. per ton if the content of ammonia is less than 24½ p.ct., but not less than 24¼ p.ct.; by 8s. per ton if the content of ammonia is less than 24¼ p.ct., but not less than 24 p.ct.; and so on. The qualitative increases and reductions apply only to deliveries of 2 cwt. and over. If the sulphate is specially ground or pulverized at buyer's request, an additional charge not exceeding 5s. per ton may be made.

(*d*) The above prices are delivered free in 2-ton lots and upwards to buyer's or consumer's nearest railway station or wharf in Great Britain (or f.o.b. British port when the ultimate destination is Ireland, Isle of Man, or Channel Islands); or *ex* works free to road vehicle to be supplied by the buyer; and packed in single bags containing about 2 cwt. net to be supplied free by sellers, tare allowed. The seller is not bound to make any allowance if the buyer elects to take delivery by road vehicle *ex* works. When credit is given, a reasonable extra charge may be made; but the discount allowed for prompt payment should be quoted on the invoice.

(*e*) For deliveries of less than 2 tons the following extra charges may be made:

1 ton and over, but less than 2 tons,	10s.	per ton	over 2 ton	price.	
2 cwt. ,, ,,	1 ton,	1s.	per cwt.	,,	,,
1 cwt. ,, ,,	2 cwt.,	2s.	,,	,,	,,
28 lbs. ,, ,,	1 cwt.,	3s.	,,	,,	,,
14 lbs. ,, ,,	28 lbs.,	4s.	,,	,,	,,

(*f*) A commission of 10s. per ton will be allowed to fertilizer mixers, agricultural merchants, and co-operative societies registered under the Friendly Societies Acts, on all deliveries of 2 tons and over.

(*g*) We shall inform you as soon after Sept. 15 as practicable the quantity we can allot you; and the name of the maker who will supply, from whom you will receive contract. We do not anticipate any difficulty in supplying the full quantity required for home use during the season, and therefore request you not to apply for more than you feel reasonably certain to require. At the same time, it must be understood that we can only accept orders subject to strikes and other conditions over which we have no control.

(*h*) If delivery instructions are sent in ample time to enable makers to deliver during any given month up to February, the price for the following month will be charged or the quantity cancelled, at the maker's option.

(*i*) Contracts will contain a clause providing for payment by the buyer of £20 per ton in addition to the contract price in the event of any part of the quantity being exported in any form, except to Ireland, Isle of Man, and Channel Islands; and it is understood that quantities purchased at the above prices will be used for home agricultural purposes only. Otherwise no restrictions will apply to the sale or disposal of quantities contracted for.

(*j*) Although the above prices are higher than the artificial scale which the Government fixed during last season at below cost price, they do not represent any additional profit to the manufacturer, in view of the large increase in the cost of coal, wages, and raw materials, and the withdrawal of subsidies. They are also considerably lower than the prices ruling in other countries, and will be found to compare favourably with prices for nitrate of soda. We would ask you to

remind farmers that sulphate of ammonia contains 20·16 p.ct. of nitrogen, and nitrate of soda only 15½ p.ct.; so that when the price of

Nitrate of soda is £25 per ton, sulphate of ammonia is worth £32 10s. per ton.
" " £20 " " " " £26 "
" " £18 " " " " £23 8s. "
" " £17 " " " " £22 "

(Signed) D. MILNE WATSON,
Chairman, Equalization Committee,
Chairman, Sulphate of Ammonia Association.

WANDSWORTH, WIMBLEDON, AND EPSOM DISTRICT GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Tuesday, at the Cannon Street Hotel, E.C.—Mr. H. E. JONES in the chair.

The SECRETARY (Mr. Chas. W. Braine, F.C.I.S.) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

EVER-RISING COST OF MATERIALS AND LABOUR.

The CHAIRMAN, in moving the adoption of the report and accounts, said the proprietors would no doubt have thought that when peace came there would have been plenty of coals and labour, as there would have been of all sorts of materials, and no trouble whatever about managing a gas-works. As they had struggled through five years of war, there might have been some reason to think that with the arrival of peace all would be smiling and plentiful. But it was nothing of the sort. They had the most arduous surroundings, and all materials remained at a very high price. To quote one example, a second-hand steam-boiler which they had just bought had cost them £300 more than a new one would have done before the war. A meter such as was used in connection with the supply of gas to a house now cost about 220 p.ct. its original price. Stoves were anything from 200 to 300 p.ct. their original cost. The same with materials like brass and copper. They had had a ship loaded at the present moment; but they could not get some work done to it owing to labour troubles; and the boat was worth about £50 a day to the Company when at work. The peace and prosperity they had hoped for had not come to them.

GOOD GENERAL CIRCUMSTANCES.

Meanwhile, the general circumstances surrounding gas companies with regard to their trade were extremely good; and the demands of consumers were not checked by the high price that it was necessary to charge for gas. As was stated in the report, the increase in the sale of gas had been 3·1 p.ct. over the corresponding half of last year; and he did not hesitate to tell the proprietors that it might have been four times as much, if only the Company had been able to get the appliances and the pipes, and other things necessary, at anything like normal prices, or even at (say) half as much again. They wanted badly to give more gas to the people who as badly needed it; but the necessary pipes at the foundry to-day cost £15 to £16 per ton, whereas they used to be able to get them at from £4 to £4 10s. per ton. This was for rough cast-iron pipes. And the cost of the laying, with the dearer labour, was at least 220 p.ct. what it used to be. The cost of restoring a pavement was about 50 p.ct. more than formerly. This was where they stood.

CAPITAL AND REVENUE ACCOUNTS—PRICE OF GAS.

Very little capital had been spent, though the Directors would have liked to be spending it on developing the business; but they would have been only diluting the dividend of the proprietors for future years had they done so, inasmuch as the price of goods (when they could get them) was absolutely ruinous from the point of view of finance. Their capital expenditure was very nearly, if not quite, the lowest to-day of any company round about. What it would be if they went on spending capital at the present prices of things, heaven only knew. At any rate, the proprietors would trust the Board to use every possible reticence in this respect, and to secure their property and their position. The revenue account showed a profit which was in excess of the amount the Company were permitted to divide; but since the balance-sheet now submitted was struck, the price of coal had been advanced another 6s. per ton, and as to labour, there was a fresh demand just now before the National Gas Council in this respect. This had led the Directors to cancel a notice (which it had given them the greatest pleasure in the world to send out) to the effect that the price of gas would be reduced 2d. per 1000 c.ft. from June. This 6s. per ton on coals meant that something between 4d. and 6d. per 1000 c.ft. would have to go upon the gas; and therefore the 2d. reduction could not be given. The question over which the Directors had got to deliberate very thoroughly and very cautiously, because it hammered down the dividends of the proprietors, was how little they could possibly afford to raise the price of gas before next Christmas. Instead of taking 2d. off, it looked very much as though at least 2d., and probably more, must go on. This had been a very great disappointment to the Board—and the more so that one class of the proprietors had already suffered so much, through having had a low standard price to begin with.

A BEGGARLY ACT.

When the Company tried to get relief under the Act—the beggarly Act, he called it—dealing with financial hardships of gas companies, the Board of Trade, because the whole of the stockholders were not in the same position, declined to consider it. Any further addition to the price of gas must, of course, again hit the Wimbledon shareholders, who were already getting a very insufficient return. What steps the Board would take between now and the next parliamentary session to place the matter on a proper footing, would be subject to the most anxious consideration of the Directors; but they did not intend to leave it where it was. It was a most unfair position. The Wimbledon area was a very prosperous district; and it was a great hardship that, because they were generous enough, when they went to Parliament, to take a low standard price, they should have had to forfeit so large a portion of their legitimate and fair dividend.

THE BURDEN OF CONTROL.

The shareholders would naturally ask how it came about that they had to alter the price of gas. The Company were under the Coal Controller, who had simply held, with a stroke of his pen, "You must pay 6s. per ton more for your coal." He (the Chairman) had a good acquaintance with coal owners, and all he could say was that they knew nothing about it. They did not ask for it, and had not been consulted; but it was done. He was, unfortunately, the Chairman of a Company supplying gas on the Continent, in whose case the price of coal had gone up, not 6s., but 25s., per ton, at the sweet will of the Coal Controller. He sighed for the day when they could get free from control, and be able to go along on the ordinary rule of supply and demand, which was the one they had lived under fairly prosperously for all these years, and which to-day they could live under with their consumers, if only they were left alone by the so-called authorities.

FIGURES FROM THE ACCOUNTS.

To return to the accounts. It would be noticed that the expenditure in the half year on capital account—which was the only portion, except one, that needed much consideration—had been £53,154. Of the items which went to make up this total, the largest figure was £38,408 for two ships which they had bought to enable them to carry their coal by sea again, instead of overland, as they had done during the last two years of the war, when they could not get coals at all by sea, owing to the submarine menace. One of their ships was sunk, and another got wrong in consequence of the lights on the coast being extinguished. But they had had such vile coal, under the Coal Controller, delivered by rail at Epsom and Mitcham, that he had been ashamed to meet the Company's consumers, because they had not had the stuff with which they could make gas of any sort at all. He was very glad to get back to ships, so that they could go to Durham for their coal. The two boats—the "Ravonia" and the "Limehouse"—which both belonged to a sister Company, were bought at about twice what they cost; but it was a most profitable and good investment for their own Company. As these ships worked for the Company at about one-half what the Admiralty Controller made them pay when they hired an outside ship, the proprietors would see that there was some advantage in making this investment. Still referring to the expenditure on capital account, they had been able to buy a wharf which extended the present wharf (which was a considerable one) by a little more then the length necessary to accommodate a barge. It had some buildings upon it; and the price they had paid was £3000, and the law expenses. It was in a very convenient position; and there was no doubt about the wisdom of acquiring a freehold wharf like this abutting on the Thames. Buildings and plant, £9393, represented chiefly a new retort-house which was approaching completion, and which they hoped, and quite expected, to be in operation next winter. It would take the place of the original retort-house which they had on the site, built many years ago by his friend, Mr. Freeman, on old lines, and therefore not quite the up-to-date two-decker one of nowadays. The Directors had pursued the construction of this retort-house all through the war. He himself had had no faith that when peace came they would be able to get all the materials required cheaply; and events had proved that he was right. To have put the retort-house up to-day would have cost them double what they were going to pay for it under an old contract. Meters, stoves, &c., were only £2207; and one reason for this was that for some time the Coal Controller, when limiting the use of fuel, made it practically impossible for them to put in stoves and meters. Another reason was that they were so dear that the Company were not particularly happy when they were called upon to put them in. They would, however, try to keep on installing them, if the consumers would pay a reasonable rent for them. The Company had to pay for the labour of attending to them 120 p.ct. additional—that was, over double. They had to pay for the repair of a meter or stove about three times what it could have been done for before the war. All these things, and the expense of attending to complaints, &c., fell upon the Company. The labour bill was shown at the foot of the accounts. The cost of labour in the year before the war (1913) was £102,000; while now the cost was about £260,000 per annum. This was an addition of about 160 p.ct. The higher costs extended all through the various departments having to do with the important outside distribution system. However, instead of having to go on his knees to secure a few hundredweights of coal, a consumer merely turned on a tap, and was quite happy, to cook the dinner and to get warmth. This was what the slot-meter user went for, and he was one of their best friends.

GOOD RESULTS IN SPITE OF ALL.

As to the revenue account, all he could say was that, in spite of difficulties, and in spite of bad material, the production from the coal secured by their officers and men (to whom they were much indebted) had relatively been as good as ever it was in the Company's history; and the difference in the profits being so small, even at the advanced price of gas, was to be found simply in the enormous figures that these costs of coals, material, and labour amounted to. It was the same story everywhere. There was one item in the revenue account which needed a little explanation. Rents, rates, and taxes, which last year came to £7200, in the present accounts figured at £11,313. There was an increase of £1405 in the rates, and of £2530 in income-tax and other taxes. This was all he could say to explain the one difference in the account which was not simply due to the cost of labour or material.

PROSPECTS OF RELIEF.

The proprietors would naturally ask the Directors, "What hope is there for us as shareholders? What policy have you got to give us?" Well, relief could only come from one source—from the High Court of Parliament. He understood that the Board of Trade had been very conciliatory. The Chief Minister of the Board of Trade had said: "I fully understand your circumstances. They are very deplorable. We shall probably do something to help you." But Ministers changed;

and he might not be in office in another three or four months' time. He might be a Lord Admiral of the Fleet, or Commander-in-Chief of the British Army, so far as they knew; and then he would not be at the Board of Trade. But even if he remained there, he might change his mind a little, and the harsh injustice of last year, by which they got three-quarters of the standard dividend, might or might not be improved upon. The position was that they had either to wait for this outside help or go and do something for themselves. Well, he did not believe in outside help. He knew that heaven helped those who tried to help themselves; and he thought they would have to make a move on their own account. But in making the move, he was bound to say that he felt some misgiving. When they went to Parliament, they were met always by local authorities who seemed to think that the best way to get cheap gas was to put one to all the trouble, anxiety, worry, and expense they could in making it. This did not conform to the average manufacturer's idea of making things cheap. The average manufacturer said: "I can make one or two classes of goods. I think the cheapest for you is (say) the 'B' or 'C,' and not the 'A' class." In the same way, he thought the Company could make more profit and give greater satisfaction if they gave the consumers the cheapest gas. Now, they would have to defend—without much difficulty, he thought—their old standard dividend; and they would have to ask Parliament to allow this to be based upon what was more likely to be the price of coal and the price of labour than was the case when the standard was fixed twenty years ago. But how did the Directors know what they were to tell Parliament on this subject? So long as the Coal Controller was in existence, he might upset the whole kettle of fish by clapping another 10s. per ton on the price of coal; and so long as labour went on with its demands, they might be liable for something there also.

SULPHUR PURIFICATION.

Parliament might again ask for what he would call a reactionary regulation upon them, as to purifying from sulphur. When they came to consider that, in a room like that in which the proprietors were now sitting, there used to be about fifty burners consuming some 250 c.ft. of gas per hour, the question of the products of combustion was a very important one. But when to-day it was possible to get a better light with a consumption of less than 20 c.ft. per hour, instead of 250 c.ft., he ventured to say that most of the trouble was gone. From the days when gas was used almost exclusively for lighting, it had come to be mainly consumed in a fireplace or cooking-stove in a chimney; and the refinement of purification which might have been good in the old days, had gone. He hoped that the authorities would be reasonable; and he was quite satisfied the gas industry would be able to show them that, if they would not put these retrograde provisions upon them, they could supply the consumer on a much more satisfactory basis. As the last time they were in Parliament they willingly exchanged the standard of illuminating power for that of heating power, they should be able to show that they could give the consumer very much more than the difference in value in heat units for the penny or twopence, or whatever it was, which he might desire to spend on gas.

THE BEST GAS.

With regard to the recommendation that they should be allowed to supply a still lower class gas, by making a corresponding reduction in the price—that was to say, the consumer who gave 4s. to-day for one sort of gas should give 3s. for it if they made the gas 25 p.ct. lower in calorific value—this looked very fair and very nice, and it attracted his attention very much at first. But if one considered that, in the price which the consumer paid for his gas, he not only paid the manufacturing cost, but interest on capital, fixed charges, and rates and taxes, and that these would not become any cheaper by the alteration, he ventured to say that, properly weighing these facts, there would be found nothing in the new proposition which would tempt the Company to go below what they were now doing. They were already under an Act of Parliament which bound them to give about 475 to 480 B.Th.U. as their standard quality of gas; and they could get this from the coal, using their own coke, which was perhaps better used in this way than if distributed by a horse and cart. They could distribute the fuel in the form of gas much better than by filling-up coal-cellars. He did not at one time hold the view he was now expressing; but the war had taught him the lesson that it would be more to their interest to turn the coke into gas, as well as the coal, and make the sort of gas which they were distributing to-day.

THE LATE PROF. VERNON HARCOURT.

He was addressing the proprietors at some length; but he thought that probably, in this time of financial stress, they would like to have some idea of what was in the minds of the Directors. In the previous day's papers he had greatly regretted to see recorded the death of an old friend of his—reminding him of advancing years. He referred to Prof. Vernon Harcourt, who was one of the three Metropolitan Gas Referees, and a very highly scientific man. He was the inventor of a process by which, by means of a small lamp and the catalytic action of platinum, he converted the bisulphide of carbon, which did not react to any agents employed previously, into sulphuretted hydrogen. He (the Chairman) had used it very frequently in his own practice for testing. It was a beautiful laboratory process, but not one which he would be prepared to recommend them to adopt on a large scale. It would require very considerable plant and much skill in adapting it. This was the only method by which they could in any way improve the purity of the gas which they supplied at present; and, as he had said, he was not prepared to recommend it. They must remember that over 90 p.ct. of their gas was consumed either in incandescent lighting (where the quantity burned was inconsiderable), or under a chimney for heating purposes. He wished to record from the chair of the Company his sorrow at the death of his old friend, and a very distinguished chemist, Prof. Vernon Harcourt.

THE GAS INDUSTRY'S WORK IN THE WAR.

He had often thought, Why is it that we have got all these financial hardships, while all the manufacturers in the country, except the producers of gas, are apparently rolling in money? If they went to any of the large cities, they would find people who had been making munitions of war rolling in money. There was any amount of it about. Yet none of them had made munitions of war such as the gas industry had made. Their industry had made the great explosive "T.N.T.," which was copied from the Germans. They had made specially distilled ammonia; and at the Mitcham works they had made charcoal for gas-masks. And what had so far been their reward? According to that eminent chemist and judge, Lord Moulton, they, together with the coke-oven people, who did the same sort of thing, practically saved the position. The war could not have been carried on successfully without them. It was only nine months after the war commenced that the authorities discovered that they wanted this "T.N.T.," and came to the gas industry for it. Right well the industry responded; and their own Chief Engineer, Mr. H. O. Carr, had damaged his health considerably (and was not present at the meeting that day), rushing about the country, putting the process into operation. Their course, if they had followed the usual business practice, would have been to have said to the Government, as no doubt other people had said: "We have been making this thing, and do not know what it will cost. You will have to give us so much for it." They ought to have stuck out for their bargain. Patriotism did not pay. Mr. Carr's patriotism had put him out of harness for a time, recuperating his health. All their officers did the same. They were washing for this thing and the other, and making ammonia by a most expensive process. Not only were they doing all this work, but they even lent the Government a wharf and a big warehouse; and within three weeks the warehouse was full of the manufactured goods of a great firm, who were highly placed in the country. The Company got no rent for the place; but he was sure the manufacturers were well paid for the stuff they put into the warehouse. The whole gas industry should have driven a proper bargain. They thought too much of patriotism. They had been too confiding, and had worked too hard for their country. They had saved the war, and yet when they went to the Board of Trade and asked for a Bill to give them a decent dividend, they were offered first of all one-half the standard dividend, though they were able afterwards to get three-quarters. He had told Sir Albert Stanley, the President of the Board of Trade: "We have served you well. Now we have come and asked you for bread, and you have given us a stone." This was the way in which they had been treated.

The DEPUTY-CHAIRMAN (Mr. R. Garraway Rice) formally seconded the motion, and it was at once unanimously carried.

THE DIVIDENDS.

The CHAIRMAN proposed the payment of dividends for the half year at the statutory rates, as follows; On the Wandsworth "A" stock, 5½ p.ct. per annum; on the Wandsworth "B" stock, 4 p.ct.; on the Wandsworth "C" stock, £3 17s. p.ct.; on the Wimbledon stock, £3 7s. 6d. p.ct.; on the Epsom stock, 4 p.ct.; and on the new ordinary stock, £3 17s. p.ct.

The DEPUTY-CHAIRMAN seconded this, and it was agreed to.

VOTES OF THANKS.

The CHAIRMAN said he would like them to pass a hearty vote of thanks to all those who had been working for the Company, from the humblest to the highest in position. They had all done their best to give the proprietors what, in happier times, would have been a satisfactory balance-sheet. He had spoken about the cost of labour, which was very great; but he did not begrudge it, because food and clothing were far from cheap. One of his own servants had told him that he was worse now with £2, than he was before the war with £1. They had initiated, he was glad to say, in connection with the Company, a Joint Works Committee of their men, officers, and directors. It consisted of 22 members—three of them directors, six officers, and two foremen. The Chairman was nearly related to him, being Mr. Frank Jones, the Deputy-Chairman of the South Metropolitan Gas Company, who therefore possessed a very extensive knowledge of Metropolitan gas politics. Through this Committee they were kept in touch with the men themselves, as well as the managers. It had been most successful in promoting the proper and good understanding which ought to exist between employers and employed, and which formerly used to exist when undertakings were much smaller, and there was a personal touch between the master and his employee. Now they had such big concerns, this was not, of course, possible; but the Committee got into touch with the men, and he heard nothing but the highest satisfaction expressed both by the men themselves and by the other members of the Committee. Their best thanks were also due to the worthy Secretary, Mr. Braine, who was very old in the service of the Company; and he was also bound to pay a special compliment on this occasion to Mr. Croft, their Assistant Engineer, who had stepped into the breach formed by the failure in health of his Chief, and had done yeoman duty. Mr. Croft had ably carried out his (the Chairman's) instructions; and he was, they knew, a terribly hard taskmaster. He had often wondered whether the failure of Mr. Carr might not have been to some extent caused through him being too exacting. Not only these two, but the other administrators at the works—the heads of the clerical departments—had all been working well; and so had the men engaged in the actual production of gas, which was an arduous occupation, though well paid. All had done really good service; and the result was shown in what would, as he had already said, but for the wretched legislative "relief" that had been given them, have been a very satisfactory balance-sheet for the proprietors.

Mr. H. S. FREEMAN seconded the vote, which was cordially passed.

Mr. BRAINE, in returning thanks, said the whole of the staff regarded their Chairman with respect and admiration.

Mr. C. M. CROFT, replying on behalf of the engineering staff, said there was a great deal of good fellowship between the officers, the foremen, and the men, and loyalty towards the Company, which made the work very pleasant, though it was somewhat hard. The Chairman gave them every possible assistance.

The Chairman and Directors were thanked for the able way in which, in spite of the difficult conditions, they had conducted the affairs of the Company; and the CHAIRMAN'S acknowledgment brought the proceedings to a close.

BRIGHTON AND HOVE GENERAL GAS COMPANY.

The Cause of a Fluctuating Consumption.

The Half-Yearly Ordinary General Meeting of the Company was held last Friday, at the Offices, No. 5, Great Winchester Street, E.C.—Mr. A. M. PADDON in the chair.

The SECRETARY (Mr. Ernest L. Burton, F.S.A.A.) read the notice of meeting; and the report and accounts were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said there was really only one feature in connection with the statement which was of at all an unsatisfactory nature—namely, that the sale of gas showed a decrease of 80,237,300 c.ft., or 8·8 p.ct., when compared with the results for the corresponding half of the previous year. But this fact was subject to considerable qualification, and on examination would prove to be of no untoward a character. Owing to the peculiar relation of Brighton to the Metropolis, during the disturbed times of the war they had a very abnormal state of things to deal with, through the influx of those seeking to escape from the air-raids. This brought about some extraordinary increases in the output of gas. For the twelve months ended June, 1918, there was an increase of 207 million c.ft.; while for the six months ended Dec. 31, 1917, the increase rose to the enormous figure of 147 million c.ft. In succession to such statistics as these, some set-back had to be apprehended. But the fact that it would interest the proprietors most to know was that, as compared with the position in the year 1914, at the outbreak of war, the Company were at present enjoying an increase of 9 p.ct. in their business; and this increase was now going on. This was certainly gratifying. As to the accounts, the capital expenditure in the six months had been only £693; whereas depreciation written-off from revenue account amounted to £1656. The capital per million cubic feet of gas sold stood at £448, which was quite satisfactory. In the revenue account, gas sold, &c., had brought in £8393 more, owing obviously to the increase in price. Residuals had yielded £12,643 more; and the total receipts were in excess of those of a year ago by £21,058. On the other side, coal had only cost £277 more, by reason of the decrease in the output of gas. Repair and maintenance charges had been kept at a very satisfactory figure; the total amount debited in these respects amounting to more than 16d. per 1000 c.ft. Directors' allowances were down by £114, owing to the peculiar arrangements existing. In a great many cases, Directors received their remuneration free of income-tax. This was not the case with their Company; and the Directors were under the added disability of having their fees proportionate to the amount of dividend paid. As the dividends had been sacrificed, the Directors were receiving something like two-thirds of the sum they did before the war; and yet the burden of their duties had been in no way diminished. The total expenditure was £18,485 more; and the balance to be carried to the profit and loss account was £2573 greater. Taking into consideration the amount brought from the last account, and adding to it the profit there was a sum of £43,808; and there was required for dividends, interest, and income-tax £19,400. This would leave a balance of £24,408, or £1256 more than was brought into the account. In consequence of the advance in the price of coal, a further increase in the price of gas was absolutely unavoidable, and must take place as from Oct. 1. This would accentuate to an even greater extent than had been the case in the past the necessity for some relief in connection with the statutory conditions and obligations under which they carried on their business.

HOW TO SECURE RELIEF.

There were two ways in which this desired end might be attained. The first was to wait upon events for that measure of relief which it was hoped the Government might be prevailed upon to grant to the gas industry generally. This was to remain inactive, and see what came of the united and comprehensive action of the gas industry as a whole—a policy which he ventured to think was hopelessly discredited by what had already happened. There had been a tendency to commit the particular interests of gas undertakings to the associated representatives of the gas industry generally. The first occasion upon which this was adopted was, he thought, about two years ago, when an attempt was made to obtain from Parliament some alteration in regard to the sliding-scale and standard price; and the results of this concerted action were absolutely calamitous. The appeal to Parliament through the medium of a Parliamentary Committee, gave them practically nothing; and the little advantage they did get (which made things barely tolerable) was one that came from open debate in the House of Commons, when something more was wrung from the Government, who allowed them to receive the totally inadequate dole of three-quarters of their dividend—a concession which never went any material way towards putting the gas industry into a position to carry on its business. If they examined the matter, it was not hard to understand that, when cases were presented in this way, they must consist of generalities which were almost incapable of proof; and they had a worse quality, in that they were the easiest possible form of appeal to ignore or to refuse. And if there was one thing a Government could do, did do, and always would do, it was to ignore or to refuse such applications until they were absolutely obliged to comply with them. There was another objection to this method of seeking redress. It was an objection in principle, but an even more important objection. He and his colleagues were there as Directors entrusted with the care of the interests of the proprietors; and the proprietors looked to them to do all that was practicable in defence of these interests. There was an old legal principle in regard to trustees (and Directors were primarily trustees), to the effect that "What is given to you to look after, you have no right to go and confide to other people." When directors were responsible for the interests of a company, it behoved them, in his judgment, to deal with matters themselves, and not merely to wait upon what might happen at the instance of people who were in just the same difficulties, without any better means of emancipating themselves. He did think that, inasmuch as they realized their position as trustees, the only proper way of dealing with this difficulty was to go back to Parliament and prove by evidence and reasoned argument that the powers entrusted to them were no longer adequate or practical in carrying on the Company's affairs, and ask for their revision and amendment. If claims put forward in this way were properly supported, they would have a cogency which they could never acquire from generalities such as he had already referred to. The other day, in the Technical Press, he had been alluded to, in very excellent company indeed, as one who ought to know the value of precedents. Well, perhaps he did. He had served a rather long apprenticeship; and he thought he did know the value of precedents. But he did venture to say that the administrator of a gas company in these days who could not devise precedents and adapt themselves to meet the deluge of troubles that had come upon them and the difficulties which threatened them was certainly not qualified to be the Chairman of the Company, and would be of very negligible value as an ordinary Director. A man who could not make precedents in these days could be of very little assistance to a gas company in particular or to the gas industry in general. It was further pointed out that precedents conceived and encouraged in the interests of one undertaking might be embarrassing to another. He could assure the proprietors that this was a consideration which would not affect either himself or his colleagues. They were in office to do their best for this particular Company; and in any steps they might take in applying to Parliament they would consider this Company, and this Company alone. They would not be deterred or influenced by the possible effect in regard to any other undertaking whatsoever of anything they might do to promote or defend the interests of this Company.

The DEPUTY-CHAIRMAN (Mr. G. W. Carey) seconded the adoption of the report, which was agreed to.

Thereafter dividends were declared for the half year at the rates per annum less income-tax of 7½ p.ct. on the original ordinary stock and 5¼ p.ct. on the "A" ordinary stock.

The Secretary, the Engineer and General Manager (Mr. C. H. Rutter), the other officers, and the Chairman and Directors were cordially thanked for their services.

BARNET DISTRICT GAS AND WATER COMPANY.

Rates of Dividend Maintained.

The Ordinary Half-Yearly General Meeting of the Company was held on Friday, at the Offices, No. 139, Cannon Street, E.C.—under the chairmanship of Mr. ARTHUR F. PHILLIPS.

The SECRETARY (Mr. Ernest W. Drew, F.C.A.) having read the notice of meeting, the report of the Directors and the statement of accounts were taken as read.

The CHAIRMAN said that, considering the strenuous times through which they had been passing, they had much to congratulate themselves upon that they were able to maintain the dividend without reducing the carry-forward. There had been no addition to the capital expenditure in either the gas or water undertaking. It remained the same as at the termination of last year. The sale of gas showed a decrease of 4,670,400 c.ft.—equal to a little over 4 p.ct.—on the corresponding previous half year. This was undoubtedly due to the rationing restrictions during last winter. The gas rental was £22,794, against £19,848; the price having been 8d. per 1000 c.ft. higher. Residual products realized £6625, against £6339. Fittings brought in £347, because the Company were no longer fixing meters and stoves on hire or without charge. On the expenditure side, coal, oil, and coke for producing the gas cost £1671 more. Purification was up £131, carbonizing wages had increased £1168, and repairs of works cost an additional £2059—all the material and labour costing double. The amount spent on stoves and fittings was £245 less; while public lighting expenses were £156 more. The reduction in the war bonus and allowances to employees on active service was £976. All other expenses were much the same; the balance carried to profit and loss being £5146, as compared with £5560 in the corresponding previous half year. In the water undertaking, the rental was practically the same as last year—the increase being only £154. There had been no new buildings erected, and few additional supplies laid on. In the expenditure, pumping charges were £964 more, due to the increased cost of fuel and wages. Rates were up £203. The charges for war bonus and allowance to those on active service was £736 less. The other expenses being much the same, the resulting balance was £13,019, against £13,642. The profit from the gas and water undertakings, with £279 interest on money deposited, added to the £25,083 balance brought forward, after providing for income-tax, interest on debenture stock, and transferring £1000 to the contingency fund, gave a disposable balance of £35,483. The proposed dividends would absorb £10,383, leaving £25,100 to be carried forward.

DIFFICULTIES AHEAD AND GAS PRICES.

If the past had been for the Board and Company's officials an anxious time, in the future he feared they might have greater difficulties to contend with—many quite beyond their control. The cost of the coal for the past half year was 3s. 8d. more per ton than in the previous year; but from the 21st of July last another addition of 6s. per ton had been made. To this there would be a further addition in the cost of freight and rates—probably 8s. or 9s. per ton—through being obliged to use Durham coal, owing to the deficiency in the supplies from Yorkshire. All materials required had gone up enormously in price; and the exacting demands of labour had had to be met. It would be evident that another increase in the price of gas must be made before long to meet such a considerable addition to the expenses; and this matter was receiving the careful consideration of the Directors. Increasing the price of the gas might mean for the proprietors a reduction of the dividend, unless there was legislation to give all gas companies the relief to which they were certainly entitled. If the Government passed a measure allowing a reasonable dividend to the proprietors, and which would enable them to raise the fresh capital required, leaving the gas industry to carry on its business without hampering it with unnecessary restrictions, it would, he was sure, be the aim of

gas companies to supply the most useful fuel for lighting and heating at the most reasonable price. The gas companies loyally endeavoured to assist the country by producing those products which were vital for the prosecution of the war. They had been thanked for doing so by the highest authorities; but no financial benefit was obtained. Instead, the companies had maintained the supply of gas ever since the war commenced with daily dwindling profits. This could not continue. It was doubtful if any other industry had suffered in the same way. He was one of a deputation to the President of the Board of Trade to set before him how serious was the position of the gas companies, when the President expressed his sympathy, and stated that the Board of Trade recognized fully the importance of the industry, and clearly that steps must be taken in some direction which would make it possible for the industry to carry on and develop. The whole Board had recently visited the gas-works and all the pumping stations, which were in a thoroughly efficient state. He concluded by moving that the report and accounts for the past half year be received and adopted.

The DEPUTY-CHAIRMAN (Dr. J. W. L. Glaisher) seconded the motion.

Mr. A. W. OKE said the outstanding feature, he thought, in connection with gas and water companies was the cost of the fuel. The Chairman had referred to the increase of 6s. per ton in the price of coal. Not only this, but owing to the extraordinary arrangements that had been made, the coal had to be brought by sea, whereas in former times the gas companies were being served well over-land. This was a burden hard to be borne by the consumers, quite apart from the shareholders. He hoped that the Board would themselves bring this matter before the members of Parliament representing the district, and also that they would refuse to accept rubbish in place of coal. It seemed to him that now the war was over, and there were plenty of people ready to do the work, the coal before it left the collieries should be properly picked over. He would like to ask how many tons of rubbish were included in the cost of the heavy coal bill shown in the accounts now presented. If they were to save the country from the terrible muddle that was being caused and the unfortunate results that must follow on the enormous increase in the price of gas, something must be done promptly.

The CHAIRMAN said they were all fully agreed as to the disadvantage of the bad quality of much of the coal that was supplied; but he did not think that he could give, even approximately, the number of tons of rubbish that had been included.

The resolution was then put to the meeting and carried unanimously.

Proposed by the CHAIRMAN, and seconded by Mr. COLIN DOCWRA, dividends for the half year ended June 30 were declared, less income-tax, at the rates per annum of 9 p.ct. on the "A" and "C" stocks, 8 p.ct. on the "B" stock, and £6 6s. p.ct. on the "D" capital gas and water stocks.

Moving a hearty vote of thanks to the Engineer, Secretary, officers, and staff, for the services they had rendered during the past half year, the CHAIRMAN drew attention to the difficulties under which they had worked. He said that Mr. Bancroft (the Engineer) had had continual trouble in keeping the works provided with coal; and he had exercised great tact in his management of the men. It was due to him probably more than to anyone else that the Company had so successfully pulled through the past half year. To Mr. Drew they owed their thanks; and the rest of the staff had also served the Company faithfully.

Mr. DREW and Mr. BANCROFT briefly acknowledged the vote.

The Chairman and Directors were also cordially thanked for their services, on the proposition of Mr. OKE, who said they were to be congratulated upon having been able to declare the same rates of dividend as the shareholders had enjoyed for some time past.

COLCHESTER GAS COMPANY.

The half-yearly meeting of the Company was held on Friday last—Mr. W. GURNEY BENHAM presiding.

The CHAIRMAN, referring to the profit for the half year, drew attention to the fact that this was only £1085, against £2358 for the corresponding half of 1918. This was the first time for very many years that the full profit had not been earned. The Company passed through war conditions practically unscathed, and without any increase in the price of gas (3s. per 1000 c.ft.) until an additional 3d. was put on late in 1918. But in the first half year under peace conditions, they were suddenly faced with this marked fall in profit. The Directors proposed to draw on the carry-forward and to pay the full statutory dividends. There was a sum of £4808 available. Dividends would absorb £2190; and there would still be a substantial carry-forward of £2600. The main cause of the falling profit was the advance in wages and, more particularly, the reduction in the hours of labour. In 1914, the wages bill was £6996; in 1918, £13,647; and for 1919, it would be £27,000. The cost of coal in 1914 was £14,747, and in 1918, £25,712; but in the interim there had been an increased output to the extent of 33 p.ct. It might be wondered how, in the face of such figures, the Company had done so well. The main cause had been good management. Residuals had also produced more; and this also had been largely due to improved working. The recent advance of 6s. per ton in the price of coal, and the enormous increase in wages, had now compelled the raising of the price of gas from 3s. 3d. to 4s. 3d. per 1000 c.ft. Conditions had lately been very difficult. The inadequate supply of coal had necessitated the use of expensive oil gas; but the supply of gas had been maintained, and at full pressure. The action of the Coal Controller in insisting on the Company obtaining part of their coal supply by water would mean a very heavy burden on the Company—the freightage, &c., adding over 15s. a ton to the cost of coal. The increase in the price of gas would in the future necessitate the reduction of the 10 p.ct. dividend on the original shares to 7 p.ct., and on the "B" shares from 7 p.ct. to £4 18s. p.ct., unless (as was hoped) the slight relief given by last year's Act of Parliament was accorded, in which case the reduction would be to 7½ and £5 5s. p.ct. respectively. It was most inequitable that there should be any reduction, having regard to the altered circumstances as to labour and cost of material and the altered value of money; and shareholders should use all their influence to secure ordinary justice and fair play from Parliament.

The report, balance-sheet, and dividends were unanimously adopted; and a vote of thanks was accorded to the Chairman and Directors, the General Manager and Engineer (Mr. W. W. Townsend), and the Secretary (Mr. English).

At a subsequent special meeting, the shareholders unanimously sanctioned the issue of £24,000 (nominal) of 6 p.ct. preference stock.

WOLVERHAMPTON GAS COMPANY.

An Ordinary General Meeting of the Wolverhampton Gas Company was held at the offices, Darlington Street, Wolverhampton, on Tuesday last. The report and balance-sheet, which showed a net profit of £5538 and an increase in the price of gas from 2s. 9d. to 3s. 3d. per 1000 c.ft., were presented to the meeting and adopted.

Mr. H. H. WARD (the Chairman) who presided, observed that the increase in the price of gas which last year he regarded as inevitable had taken place, reducing automatically the dividends on the consolidated and new ordinary stocks to 8½ and 4½ p.ct. per annum respectively. It should not be necessary, he thought, to further increase the price. At the same time, there did not appear any tendency towards reductions, either in the price of coal or in the cost of labour; and they were not getting any more money from residuals. In the circumstances, the Company were fortunate in passing through the year as they had done. The benefits arising from the advanced charges covering only six months of the past year, would cover the entire year now current.

Mr. FREETH asked whether any improved illuminating power was possible.

The CHAIRMAN replied that, in view of the quality of the available supplies of coal, they could not make any definite promise in the direction mentioned.

Mr. HARLEY considered the shareholders had much to be thankful for, and proposed a vote of thanks to the Directors, the Manager, and Secretary, which was passed, and acknowledged by the Chairman.

The ENGINEER (Mr. P. G. Winstanley) said the increases in wages and the reduction from 55 to 47 hours in the working week had added £4000 to the cost of production. The trouble in Yorkshire, causing them to go to Durham for supplies of coal, had increased the cost of transport from 3s. 1d. to 8s. 6d. per ton; nearly 10 p.c. being unfit for use in the retorts. The most gratifying features in their present position were the improvements effected in regard to the plant, and the steady extension of the business. On the whole, they might anticipate a return to former prosperity.

STRIKE OF CORK GAS WORKERS.

A serious situation arose in Cork last week, owing to a strike of the city gasworkers on the question of a shorter working day and increased pay. When the men left the works on Thursday afternoon, the supply of gas was not sufficient for more than six normal hours' consumption; and soon there was a heavy falling off in the pressure, and many housewives found they had no gas to cook the usual early afternoon meal. For trades using gas-engines, as for public installations, the strike naturally created the utmost inconvenience. At night, the city was in darkness, save in the main thoroughfares, where the electric light is used. Candles and oil-lamps were in great demand in shops and private houses. A similar state of things prevailed on Friday and Saturday; and with a local coal scarcity and high prices to add to the trouble, the working classes and the poorer people had to be content with cold meals. Numerous small industries were held up. Sunday was also a day of hardship. Fortunately, it was decided that work should be resumed on Sunday afternoon; but a normal supply was not available until Monday.

The men's decision to return was taken at a meeting at which the Lord Mayor (Mr. O'Connor) presided. A suggestion has been submitted from the Directors of the Gas Company that the matters in dispute should be settled by arbitration before the Cork Conciliation Board; and this was approved. The men's wages range from 32s. to 41s. per week; and their demand is for a minimum of 50s. for all adult workers. The Directors made an offer, which was refused. They then intimated that they could not possibly accede to the workers' demand on the wages question unless they obtained permission from the Board of Trade to increase the price of gas.

Newtownards Gas-Workers' Strike.—Great inconvenience arose from the lack of gas in Newtownards owing to a strike of workers on the question of union recognition. An agreement had been arrived at between the Urban Council and the men; but no mention had been made of the union. Subsequently, it was urged that the union had been ignored; and the men resented this, and stopped work.

Ennis (co. Clare) Gas Company in Liquidation.—In the Chancery Division of the High Court of Ireland, Dublin, before Mr. Justice Samuels, in relation to a petition for the winding-up of the Ennis Gas Company, Mr. H. Kennedy applied on behalf of the petitioners for an order fixing the security of the Liquidator who had been appointed by the Court. The Company was, Counsel said, hopelessly insolvent. It was desired, however, to sell the concern to a syndicate of business men in Ennis, who propose to light the town by the Company's plant. In the ordinary course, the security would be fixed at Chambers; but, in order to carry on, it was necessary to have it fixed at the earliest moment, so that the Liquidator might go into possession. The total assets, including debts, amounted to £4458; and the Liquidator was willing to give security to the extent of £4000. Mr. Justice Samuels made the order sought.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Sept.* 1.

Pitch remains the outstanding feature in the London tar products market. There are numerous inquiries, and increased prices are expected. Benzol is still in good demand as a motor fuel, and there are some inquiries for pure toluol; the prices being unaltered. Solvent naphtha is about 2s. 4d. net per gallon, and creosote 6d. net per gallon in bulk *ex* the makers' works.

The sulphate of ammonia position remains unchanged.

Tar Products in the Provinces.

Sept. 1.

The average values for gas-works products during the week were: Gas-works coal tar, 36s. 9d. to 41s. 9d. Pitch, East Coast, 63s. 6d. to 64s. 6d. per ton f.a.s.; West Coast—Manchester, 54s. to 56s. 6d.; Liverpool, 54s. to 56s. 6d., Clyde, 65s. to 70s. nominal. Benzol 90 p ct., North, 1s. 8d. to 1s 10d.; crude 65 p.c., at 120° C. 11½d. to 1s. 0½d. naked at makers' works; 50-90 p.ct. naked, North, 1s. 8d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 11d. Heavy naphtha, North, 2s. 1d. to 2s. 3d. Creosote, in bulk, North, liquid, 5d. to 5¼d.; salty, 4½d. to 4¾d. Heavy oils, in bulk, North, 6d. to 6¼d. Carbolic acid, 60 p.ct. 1s. 5½d. to 1s. 6d. Naphthalene, £15 to £17 10s.; salts, £4 10s. to £6, bags included. Anthracene, "A" quality, 7¼d. to 7½d. per minimum 40 p.ct.

FROM A MARKET CORRESPONDENT.

Tar Products.

General trade conditions are reflected in the market for tar products. Business is not assisted by a system of licences; and in view of the further powers to be given to the Board of Trade, prospects are not considered very rosy. The shortage of coal, as the result of the recent strike in Yorkshire, is still having a bad influence. Although the miners are back at work, full deliveries are not yet coming forward; and it seems as though the shortage would not be relieved this side of the winter. Bye-product production is accordingly restricted. London pitch is very firm; a fair quantity is being sent to Spain. But Provincial makers are holding back in anticipation that they will be able to obtain much higher prices in the autumn and winter. Crude tars are without much change; while naphthalenes remain dull. Creosote is steady, and cresylic acid is firm at a rather lower level. Carbolic acid is again firmer; and the position seems to be improving gradually. The selling price of crystals is now about 9d. per lb., and reports are to hand that 1s. 10d. per gallon has been paid for crude 50's. Probably 2s. could now be had for crude 60's; and although it would just about pay to take out the acid at this price, it is hardly sufficient to increase production very much. Benzols are in request, particularly for motor purposes. Provincial makers can readily dispose of their output; there being good orders from Ireland. There has recently been a fair export demand, which is said to originate in Germany, where the spirit is needed in connection with the dye industry. Solvent naphtha is a trifle harder. Other products are without change.

The range of quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North, 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 9½d. North; crude 60-65% 1s. 5d. to 1s. 7d.; pure, 3s. per gallon naked.

Carbolic Acid: Crude 60's 1s. 10d. per gallon nominal; crystals, 40%, 9½d. per lb. asked.

Crude Tar: London, 47s. to 50s.; Midlands, 44s. to 46s.; North, 44s 6d. per ton *ex* works.

Pitch: London, 70s. to 72s. 6d. per ton; East Coast, 60s. to 65s. per ton; West Coast, 57s. to 60s., with Manchester 59s. 6d. per ton and Glasgow 60s. per ton; South Wales, 64s to 68s. per ton.

Solvent Naphtha: London, 2s. 5d. Provinces average 2s. 3d. per gallon.

Crude Naphtha: Naked, 10d. per gallon.

Heavy Naphtha: 2s. 3d. per gallon.

Naphthalene: Refined, £15 to £17 per ton nominal; crude, £4 to £8, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d.

Creosote: London, 7¼d.; North, 5¾d. to 6¼d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 7d. to 7½d. per unit per cwt.

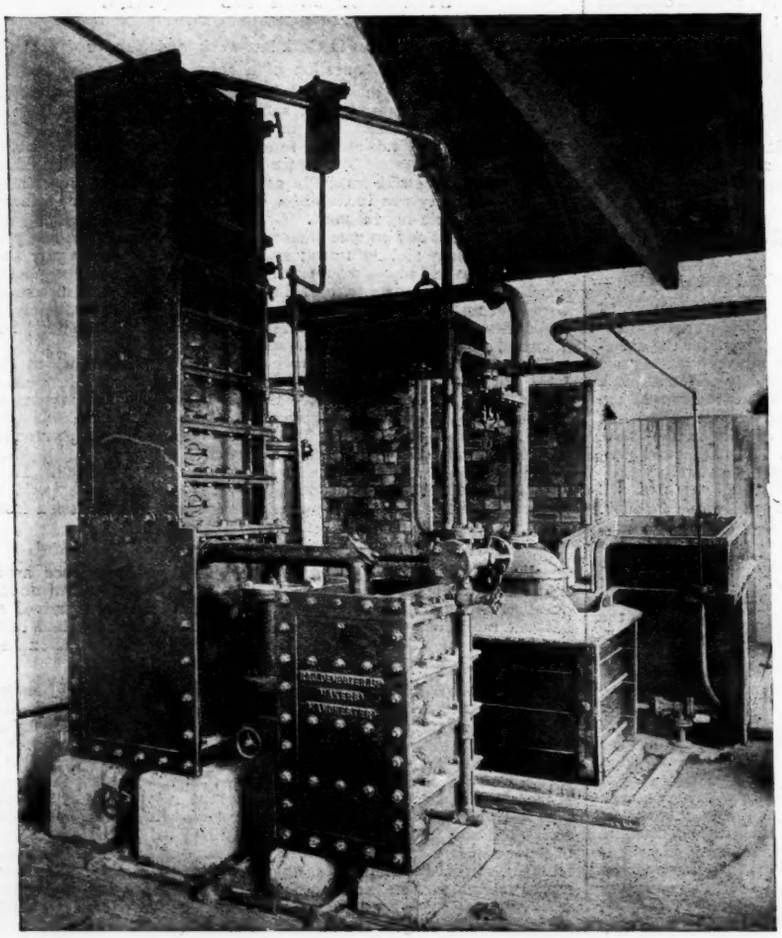
Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95%, 2s. 4d. to 2s. 5d; 97-99%, 2s. 7d. to 2s. 8d. *ex* works London, f.o.b other ports.

Sulphate of Ammonia.

Output is still restricted, and it is already certain that practically the whole of the make will now have to be reserved for home agricultural purposes. Steps have now been taken to cut down the export trade, which was beginning to assume fair proportions to Japan and the Dutch East Indies. The new prices to be charged for deliveries between October, 1919, and next May have been arranged; and, as anticipated, they show increases ranging from £1 per ton for October delivery to £2 10s. per ton increase in March, April, and May next. Thus: October, £20 10s.; November, £20 15s.; December, £21; January, 1920, £21 7s. 6d.; February, £21 15s.; March-April-May, £22 per ton, with the usual allowance to merchants, agents, &c. These prices presumably will be considered satisfactory, as although they do not leave much margin over present costs of production during the next couple of months, next year's prices should be profitable for



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the manufacturer. Nitrate of soda is hardly likely to compete very seriously with sulphate, even at the advanced quotations, owing to the lack of shipping—and the high freights for what shipping there is from Chile to Europe—to bring nitrate here in time for next season. The result of this will be that sulphate of ammonia will continue to be preferred by the farmer—whose use of nitrate would release an equivalent quantity of sulphate for export—and makers will be prevented from realizing the much better quotations which foreign buyers are willing to pay. This leaves the field open to Germany and the United States. The latter country is already able to export sulphate at under £20 per ton f.o.b. New York. Since my last report, there has been a further slight decline, which had no effect in producing fresh business with buyers not much interested in forward deliveries at the present time.

Barnsley Gas Company.—At the annual meeting of the Barnsley Gas Company, the Chairman (Mr. E. G. Lancaster), in moving the adoption of the report and the payment of the maximum dividend, said last year had been the most trying he had experienced during the past 25 years; and the satisfactory result was due to their being able to utilize unclaimed discounts of former years, amounting to £2900. This source of relief would not be again available. They were not likely to have a decrease in the cost of coal or wages during the coming year; and the only source of relief seemed to be in an increase of selling price, as in the case of most other gas concerns. The Company had now 15,109 consumers, of whom only four had objected to the last increase. The Barnsley price used to be regarded as at the top among Yorkshire charges; but now it was at the bottom, the advance on pre-war charges having been only 10d. per 1000 c.ft.

Bognor Gas Company and Electricity "Dabbling."—The accounts presented at the half-yearly meeting of the Company showed a balance of £3959, out of which the Directors recommended the payment of the full statutory dividends, which would amount to £1023 and leave a balance of £2936 to the credit of profit and loss account. The Directors stated that the financial situation had been in no way eased through the termination of the war; but, on the contrary, wages had been again advanced under the order of the Court of Arbitration, and the working hours had been reduced, with no corresponding reduction in pay. The Chairman (Mr. H. Lovett) said it was not a very encouraging or prosperous report. The cause of this was the increased cost of coal and the wages, which were more than double as compared with other years. Mr. Cox (a shareholder) said the Company had been on the down-grade ever since they commenced to dabble in the electric light. The electricity department was the cause of all their troubles. Eight years ago he was one of four who voted against the Company having anything to do with the electric light undertaking. All he wanted now was to sell out and be done with it. A strong resolution was passed protesting against Durham coal being forced upon them as utterly unsuitable for the requirements of the undertaking; and it was directed that this should be sent to Lord Edmund Talbot.

Joint Inquiry as to Hours and Output.—There is to be an investigation by a Joint Committee representing the employers and the unions in the shipbuilding and engineering trades into the economic relation of production to hours of work; and meanwhile the application of the unions for a reduction of the working week from 47 to 44 hours has been adjourned.

Scunthorpe's New Gas-Works.—With regard to the proposed new gas-works at Scunthorpe, the report of the consulting expert presented at the last meeting of the Urban District Council, showed that the cost would be treble—entailing an outlay of £100,000. The capital charges, even if there was double the consumption of gas, would be a burden for many years. Therefore it was decided to defer the question; and meantime have plans, specifications, and estimates prepared for extending the present gas-works at a probable cost of £10,000. Application is to be made to take up a loan for this sum. Authority is also to be obtained for raising the charges for gas.

Coal Difficulties and Price Increase at Retford.—At a meeting of the Retford (Notts) Town Council on Friday last, the Gas Manager reported that, owing to the coal strike in Yorkshire, he had received only four trucks of coal from the 15th to the 31st of July, and that the pressure of gas to the town had been reduced in order to prolong the period during which the stock would last, and that it would be further gradually reduced. The price of coal had been increased by 6s. per ton by authority of the Board of Trade, and the price of coke had consequently also been increased by a similar amount. The Manager submitted his estimate of the increased cost of gas through the 6s. per ton advance in coal; and the Council, on his recommendation, decided to increase the price to ordinary consumers by 6d. per 1000 c.ft. and to reduce the quantity supplied through slot meters to 16 c.ft. per penny. These new charges are to come into force from the meter readings at the end of September. There will be the usual discount of 5 p.ct. on the ordinary accounts.

Thirsk Maximum Gas Price.—Some discussion took place in the Thirsk Rural District Council over a motion (which was eventually defeated) that the Council oppose the application of the Thirsk Gas Company for an Order empowering them to increase the price of gas from 5s. to 6s. per 1000 c.ft. Mr. Meek, who seconded the motion, contended that the Company had failed in their obligation to supply the people with gas. Mr. Pearson (who is a Director of the Company) replied that if the Company had been in a position to supply gas, they would have done so. In 1913 they paid 13s. 8d. a ton for coal, while now the price was 35s. 4d. Expenditure had gone up 52 p.ct. over 1913. In addition, there were the 6s. increase in the price of coal and new hours for workmen, which would further increase the expenditure to 81 p.ct., compared with pre-war days. If the Board of Trade granted the increase, the Company's receipts in proportion would advance to 51 p.ct., thus making a difference between the expenditure and the receipts of 30 p.ct. The Company were putting in new retorts; and they would be able to make more gas than hitherto.

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Richmond Stove Company's New Premises.

For some time past the premises occupied as showrooms and offices by the Richmond Gas Stove and Meter Company, at No. 132, Queen Victoria Street, have been inadequate; and the progressive policy of the firm is again evidenced by their decision to remove in the autumn to the large island site at Nos. 164 to 172, Queen Victoria Street. These premises, which are only a short distance from the Company's present address, and directly opposite St. Paul's and Blackfriars (S.E. and C.R. and Metropolitan) Railway Stations and adjacent to "The Times" offices, were formerly occupied by Messrs. Spiers and Pond; and the Richmond Company are indeed fortunate in securing so commanding a position, and one very easily accessible by train, bus, and tram. The whole of this block of buildings is to be taken over for offices and show-rooms, in which every type of modern gas apparatus will be displayed, both for domestic and industrial uses; and when the extensive alterations and re-decorations are complete, they will be possessed of a London house fully in keeping with the growth and present status of their business.

Quality of Manchester Gas.—At a meeting of the Gas Committee of the Manchester Corporation, last Friday, it was reported that the ordinary coal contracts were now coming forward, and that it was unlikely that any further complaints regarding the quality of gas supplies in the city would be received. In consequence of the Committee being compelled to exercise very strict economy, there will be restricted lighting in Manchester during the coming winter. The streets will be lighted as in normal times; but it will be impossible to light the lamps in courts and passages.

Wages Question at Dundee.—A request for higher pay has been received by the Dundee Corporation Gas Committee from the National Federation of General Workers, which embraces employees in the gas department. At a meeting of the Committee last week, the Town Clerk read the correspondence on the matter, which showed that the Federation were requesting an increase of 10s. a week for adults and 5s. per week for juniors. The Federation of Gas Employers have, it was intimated, replied to this application to the effect that the claim cannot be entertained, as any increase in the wages of gas employees was unjustifiable at the present time. They have also declared that, if the demand is persisted in, the Federation of Gas Employers will have no alternative but to formulate a counter-claim for a reduction of wages. The Convener added that another conference is to be held, at which the Council will be represented. Mr. A. Yuill (the Manager) stated that the present minimum wage for gas labourers is £3 2s. 8d. per week. Mr. Spence (the Convener of the Works Department) declared that they must come to an end some time in the matter of wages. A lively discussion resulted in the resolve to do nothing in the matter pending a further decision to be come to by the Federation of Gas Employers.

Grays and Tilbury Gas Company.

The half-yearly meeting of this Company was held at No. 4, Eastcheap, E.C., yesterday (Monday) week—Lieut.-Col. F. E. Bartlett in the chair. With reference to the accounts the only capital items of note were £1074 for the new site, and £1209 for meters and cookers rendered necessary by the extension of the Company's business. Compared with the corresponding period of 1918, the revenue account showed an increase in the gross profit of £542. Less coals by 626 tons were carbonized; but the cost was £234 more. Practically all other charges were much higher, owing to the increased costs of labour. The revenue from sales of gas showed an increase of £5533, partly due to the increase in the price charged and partly to increased sales; while the revenue from residual products showed an increase of £353. The ratio of working expenses to revenue was 79 p.ct., while the sales of gas showed an increase of over 29 p.ct. The payment for the last half year of dividends at the rate of 7½ p.ct. per annum on the "A" shares and at the rate of 5¼ per cent. per annum on the "B" shares (less income-tax) was agreed to.

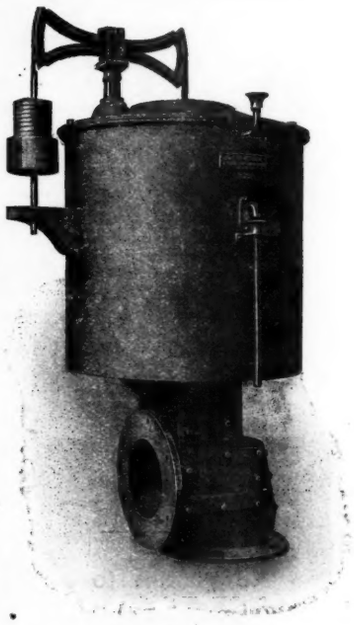
Drogheda Gas Undertaking.—The Drogheda Gas Committee, reporting to the Corporation on the finances of the department, urged that unless the price of gas be increased the works could not continue on the present basis. The works accounts had been in debit since August, 1916. In Septembor, 1918, the Local Government Board for Ireland were approached for liberty to increase the price of gas from 5s. 6d. to 6s. 6d. per 1000 c.ft.; but they would only give consent to an increase of 6d. With the extra price of coal, and increase in wages and cost of materials, it was now imperative that the charge for gas should be increased by 1s. per 1000 c.ft. The Local Government Board had agreed to the increase, in the circumstances; and it was recommended that application should be made for liberty to fix the price at 7s., cash discounts on gas accounts to be discontinued. The report was adopted.

The Benzol Motor Fuel Test.—A start was made from London last Thursday afternoon with the 10,000 miles travelling test of benzol as a fuel. The object of the test, of course, is to encourage the use by motorists of home-produced benzol. It is urged by the Automobile Association that, if the gas-making industry instals the most modern methods of treating coal, enough benzol can be produced to provide, at all events, for all the private cars in the country. In order to show that, when it is of good quality and standard specification, it has no deleterious effect either on the car or engine parts, the Automobile Association, in conjunction with the National Benzol Association, are undertaking this trial. The journey will take ten weeks, and almost every part of the United Kingdom will be visited. Fuel supplied by the National Benzol Association will be picked up at various places. Captain R. H. Montgomery, the head of the Fuel Department of the Automobile Association, is accompanying the car as observer.

BRADDOCK'S
RETORT-HOUSE
GOVERNORS
HAVE PROVED TO BE
SECOND TO NONE.

Many repeat orders have been received.

Braddock's New Patent Retort-House Governor is a further improvement and is especially desirable for use with Vertical Retorts.



No. 310.
Braddock's New Patent Enclosed Retort-House Governor.
Latest Type.

Further Particulars upon Application.

J. & J. BRADDOCK (BRANCH OF METERS LIMITED), Globe Meter Works, OLDHAM.
Telegrams: "BRADDOCK, OLDHAM." National Telephone No. 815.
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Telegrams: "METRIQUE, LAMB LONDON." Telephone No. 2412 HOP.

Importation of Oil.

The Board of Trade understand that the notice issued by them with reference to the interim administration of the Government's key industry policy has led to some misapprehension. Pending legislation, a general licence under the Prohibition of Import Proclamations is to be issued to cover all goods with the exception of those set out in the list of key industries. In the case of kerosene and benzene (including white spirit), gas oil, and fuel oil, this general licence refers to total quantity of import, and does not affect the agreement entered into by the Government to limit the number of importing firms for the period of the existence of the Pool Board, and nine months thereafter, to those firms which co operated with the Governmedt to form the Pool Board, as a result of which the community received material benefits. The termination of the war organization of the Pool Board as from Jan. 31, 1919, was announced on Jan. 2. The nine months' period which has to elapse before other firms are allowed to import does not therefore expire until Oct. 31.

No Electric Light in Epsom.—Telegraphing last Friday night, the correspondent of the "Daily Telegraph" reported: "All the employees of the electricity works have come out on strike. Just before nine o'clock this evening nearly the whole of that portion of the town which is electrically lighted was placed in darkness; and it was found that someone had disconnected the supplies at the main-feeder boxes in the town. The streets were unlighted; and residents who have no gas in their homes had to use candles. One of the picture palaces had to close-down; and meetings in public buildings had also to be cut short.

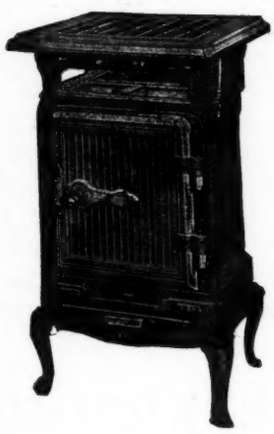
Testings of Sheffield Gas.—According to the "Sheffield Telegraph," the monthly record of the tests made during July on behalf of the Sheffield Gas Consumers' Association showed that while the Corporation's 21 tests for calorific power gave the percentage below standard to be *nil*, the Association's 172 tests showed a percentage of 72 below standard. In their observations the Association says: "The calorific power has not been maintained at the average recorded in our last report. During the first weeks of July our recording calorimeter indicated great variations in the quality of the gas—20 to 25 p.ct. difference in heating power being observed in a few hours. The attention of the Gas Company was called to the serious difficulty in maintaining constant furnace temperatures under these conditions, with the result that the fluctuations immediately ceased. The pressure has been well maintained; but the non-combustible gases are still much above the 12 p.ct. limit which the Fuel Research Board recommends should be adopted as one of the gas standards of the future." The Association has been invited to take part in a conference arranged by the Fuel Research Board to discuss the standards of quality and pressure and the conditions of testing which it is hoped will be applicable to gas-works throughout the country.

Bishop's Stortford Gas and Electricity Company.

In their report for the half year ended June 30, which was submitted at last week's meeting of the Bishop's Stortford, Harlow, and Epping Gas and Electricity Company, the Directors stated that compared with the corresponding period of the previous year, the sale of gas showed an increase of 3,933,800 c.ft., or 7·1 p.ct.; but the revenue from the sale of residual products was £71 less. The balance to the credit of the revenue account for the half year was £3408. After providing for interest charges and income-tax, an amount of £2656 was added to the profit and loss account, which, with £81 brought forward, made the balance available for distribution £2737. The Directors recommended dividends for the half year at the rates per annum (less income-tax) on the "A" and "B" ordinary stock of £3 15s. p.ct.; on the "C" preference stock of £5 p.ct.; and on the "D" preference stock of £4 p.ct. This appropriation would require £2602, and leave a balance of £135 to be carried forward. The dividends recommended on the "A" and "B" ordinary stocks were at the maximum rates authorized by the terms of an Order applying to the Company made by the Board of Trade, pursuant to the provisions of the Statutory Undertakings (Temporary Increase of Charges) Act, 1918. The cost of producing gas had been increased by further additions to the rates of wages paid, which are now more than double those paid before the war. But a still more serious burden was placed on the Company and on the consumers by the extraordinary increase of 6s. per ton in the price of coal, which has been imposed by the Government to meet increases in the wages of the miners and the cost of the reduction of their working hours. These enhanced charges will necessitate a considerable advance in the price of gas. It was with much regret that the Board recorded the death in June of Mr. J. W. Portass, the Company's Manager. Mr. Portass had served the Company faithfully and well for the long period of 29 years. The vacancy thus created has (as already announced) been filled by the appointment of Captain Ralph Staley, M.C., R.E., who, besides being an experienced gas engineer, has nearly four years of war service to his credit.

The Proposed Inquiry at Burnley.—The Burnley General Purposes Committee last week discussed a resolution of the Gas Committee asking to be relieved of the appointment of an expert to examine the working of the gas undertaking. Mr. Sutcliffe said he had interviewed the Chairman of the Gas Committee and also the Gas Manager (Mr. J. P. Leather) and he was prepared to allow the motion for the appointment of an expert to fall through. He proceeded to refer to the allegations he had previously made; and the meeting felt it necessary to conclude the inquiry, in order that the point at issue might be definitely settled. Therefore they decided to secure the names of experts, from whom the Committee might make a selection, to undertake the investigation. The Gas Committee had all along held the inquiry to be an unnecessary one, as well as a slight upon their management.

Gas and the Housing Problem.



PENDING the necessary provision of new houses, the best has to be made of existing accommodation. The essential economy of space is secured by the use of the ideal Cookers in present circumstances — Main's "Kent," "Sussex" and "Surrey." These efficient and compact cookers embody all recent improvements and are designed with a view to securing the minimum cost for maintenance.

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WORKS: Gothic Works, EDMONTON, N.18; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
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Gas-Works Ownership at Redcar.—In stating that the Redcar Urban District Council have resolved to purchase the undertaking of the local Gas Company, the "Yorkshire Post" adds that "the price is said to run into six figures."

Billingborough and Horbling Gas Company's Liquidation.—Owing mainly to the increased cost of gas production, the Billingborough and Horbling Gas Company have lately ceased operations; and the shareholders are winding-up the affairs in voluntary liquidation. The Company was established in 1864 with a fully paid-up capital of £2000; and up to the period of the war it was a regular dividend-paying concern. As no other system of lighting and cooking has been introduced, serious inconvenience to both business and private people has arisen. The works are to be offered for sale.

Heroism in a Gas-Works Tragedy.—According to a Reuter telegram from Brussels last Saturday week (Aug. 23) in the evening four workmen descended a "shaft" at the gas-works at St. Josse, with the object of locating a leakage. As they failed to make their reappearance, five of their companions also went down, to find out what had happened and to render assistance in case of need. They discovered the dead bodies of the four men, who had been asphyxiated; but not before they themselves were poisoned by the escaping gas to such an extent that they had to be immediately removed to the hospital.

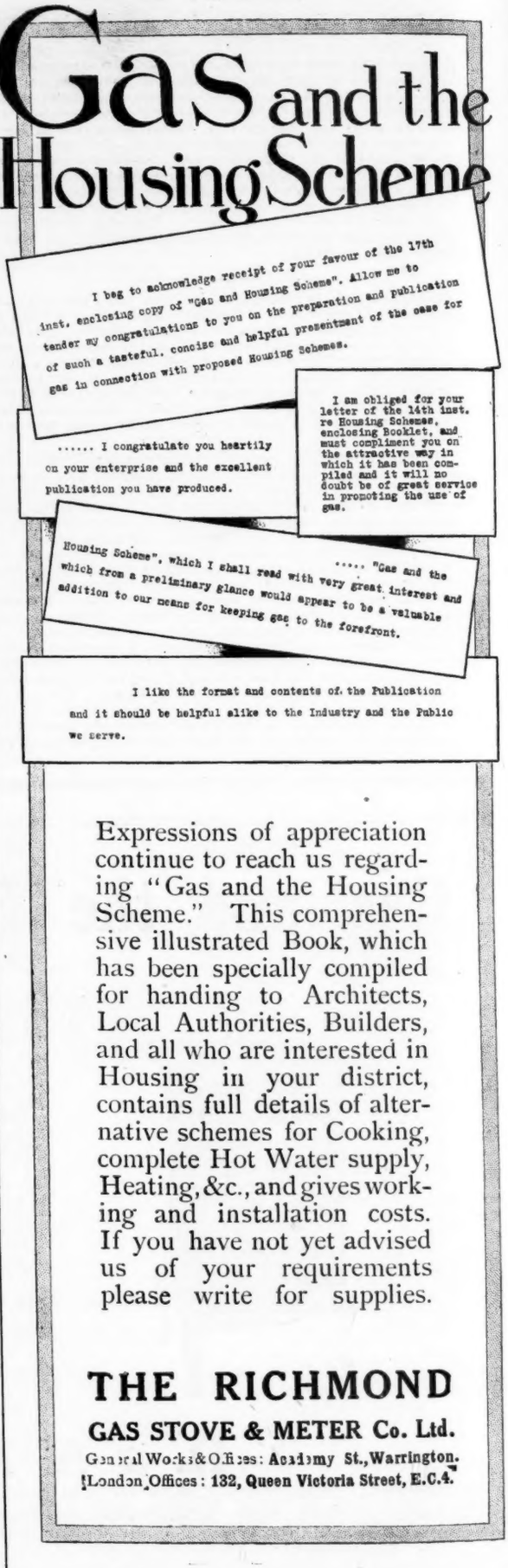
Romford Gas Company.—With sales of gas in the first half of this year showing an increase of 4·67 p.ct. over the corresponding period of 1918, the accounts presented at the half-yearly meeting of shareholders on the 23rd ult., showed a revenue profit carried to the profit and loss account of £3549. To this was added the sum of £85 for interest on mains laid on undeveloped estates and bank interest, making a gross profit for the half year of £3635. This added to the balance brought forward from the previous half year made an available total of £8033. After providing for interest on the reserve and insurance funds, debenture bonds, and consumers' deposits, there remained a net balance of £7318, out of which the Directors recommended that dividends of 6 p.ct. on the original shares, and of 4½ p.ct. on the B shares (both less income tax) should be paid—amounting to £2681, and leaving £4637 to be carried forward.

Leatherhead Gas and Lighting Company.—The receipts of this Company for the year ended June 30 amounted to £33,105, and the working expenses to £30,100, leaving a gross profit of £3005. Deducting interest on loans, debenture stock, and bank overdraft, as well as income-tax, there was left a net balance of £509, to which had to be added £1892 brought from the previous year. This was reduced by the interim dividend of 2 p.ct. to £1529, which was available for division. At the recent meeting, the Directors recommended the payment of a final dividend of 2 p.ct., making 4 p.ct. for the year, and leaving £656 to be carried forward. The Directors very much regretted the death of Mr. W. H. Brown, who had been on the Board for thirteen years. They were pleased, however, to be able to report that their late Consulting Engineer, Mr. F. S. Cripps, had consented to fill the vacancy on the directorate.

Gas Finance at Smethwick.—In a report issued by the Gas Committee of the Smethwick Town Council, an advance in the price of gas is recommended. The Committee explain that, in consequence of the increase of 6s. per ton in the price of coal, they made an application for an Order authorizing the Council to increase the maximum charge for gas. It has been necessary to forward a statement to the Ministry of Health, and the estimate made provides for a reduction of 12½ p.ct. in the output compared with last year. After allowing for an increase in the revenue resulting from an addition of 6s. per ton to the price of coke, there is a deficiency of £16,000 to be provided for by raising the price of gas. For lighting and domestic purposes, and for power and heating, they have recommended that the increase be 7d. per 1000 c.ft., and that the quantity of gas allowed for 1d. by prepayment meters be reduced from 20 to 15 c.ft., with a rebate of 12½ p.ct. on the amount collected from the meter.

Appreciation of Services at Abercarn.—A resolution has been passed by the Gas Committee of the Abercarn Urban District Council placing on record their high appreciation of the valuable services rendered by Mr. T. Wilkinson (the Gas Manager), and stating that the satisfactory trading account and report for the past twelve months are in every way due to his energy, ability, and management. Among other matters specially mentioned by them are the increased yield of gas per ton of coal carbonized and the low percentage of unaccounted-for gas. The report of Mr. Wilkinson states that there is a net profit of £608 on the year's working. The total quantity of gas made was 39,296,000 c.ft., which was an increase of 4,740,000 c.ft. on the previous year. The production per ton of coal carbonized was 12,219 c.ft., which compares with 12,036 c.ft. a year ago. Mr. Wilkinson says: "The improved works results, along with the reduction in the leakage account, contributed largely for the great reduction which was made in the price of gas to the consumers during the years 1914 to 1917, and also to the present low rate, which is only 12 p.ct. higher than the price charged in 1913."

Chichester Gas Company.—At last Monday's meeting of this Company, the Chairman (Mr. W. A. Walker), alluding to the effects of the war, said he did not think that, having regard to all the circumstances, the gas industry had fared very well at the hands of the Government; and he made particular reference to the action of the Coal Controller in ordering that all gas-works south of the Thames should use nothing but seaborne coal, which in their own particular case would involve an increased cost of 7s. or 8s. per ton for carriage—and that for material nothing like so suitable for their purpose as that which they had been accustomed to use. From what point of view this course had been thought to be justifiable, he could not conceive. The increase in the expenditure on coal amounted to £882; the average price per ton working out at 37s. 6·36d. A great deal of the coal they had been receiving had been much below pre-war quality; but it was a case of this or none. The return for the whole of their residual products had been equal to 54 p.ct. on the cost of the coal; and this, he thought, was a very satisfactory result to have achieved. On the motion of Mr. A. W. Oke, a resolution was passed protesting against the action of the Coal Controller in reference to seaborne coal.


Gas and the Housing Scheme
I beg to acknowledge receipt of your favour of the 17th inst. enclosing copy of "Gas and Housing Scheme". Allow me to tender my congratulations to you on the preparation and publication of such a tasteful, concise and helpful presentment of the case for gas in connection with proposed Housing Schemes.
I am obliged for your letter of the 14th inst. re Housing Schemes, enclosing Booklet, and must compliment you on the attractive way in which it has been compiled and it will no doubt be of great service in promoting the use of gas.
..... I congratulate you heartily on your enterprise and the excellent publication you have produced.
Housing Scheme", which I shall read with very great interest and which from a preliminary glance would appear to be a valuable addition to our means for keeping gas to the forefront. ..... "Gas and the
I like the format and contents of the Publication and it should be helpful alike to the Industry and the Public we serve.
Expressions of appreciation continue to reach us regarding "Gas and the Housing Scheme." This comprehensive illustrated Book, which has been specially compiled for handing to Architects, Local Authorities, Builders, and all who are interested in Housing in your district, contains full details of alternative schemes for Cooking, complete Hot Water supply, Heating, &c., and gives working and installation costs. If you have not yet advised us of your requirements please write for supplies.
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Wexford Gas Company.—Mr. John E. Barry, D.L., presided at the meeting of the Wexford Gas Company at which the accounts for the past year were submitted by Mr. H. W. Saville (the Secretary and Manager), and adopted. Dividends of 6½ p.ct. on the "A" shares and 3¼ p.ct. on the "B" and "C" shares were declared.

Increased Price Recommended at Leeds.—At their meeting last Tuesday the Gas Committee of the Leeds Corporation decided to recommend the City Council to increase the price of gas from 4s. to 4s. 10d. per 1000 c.ft. This is a direct outcome of the 6s. per ton advance in coal, which will mean an extra £42,000 for the Leeds gasworks, in addition to which there is an additional £7400 to provide for increased wages to the men. Before the war the price of gas in Leeds was 2s. 2d. per 1000 c.ft.; but in the meantime the cost of coal has gone up by 177 p.ct., and the wages bill has advanced by 75·8 p.ct., or about £84,000 a year. Including the 6s. advance, the cost of coal is now 32s. 3d. per ton. The Committee reviewed the whole position last week, and came to the conclusion that the department could not pay its way unless a further 10d. was put upon the price.

A Fatality at the Leicester Gas-Works.—A verdict of "Accidental death" was returned at an inquest on the 22nd ult. at the Leicester Infirmary, on the body of Andrew Stuart, aged 21, who died from the effects of a fall while at work. The evidence showed that deceased, with other workmen, was engaged on a girder roof of the retort-house of the Aylestone Gas-Works, when he fell, owing to the collapse of one of the girders. It was stated that deceased ought not to have walked on the girder. Death was due to shock following a fracture of the skull.

Darwen Municipal Finances.—The Darwen Borough Treasurer has issued his statement on the town's finances during the past municipal year, showing that the losses in trading departments in 1918 of £4279 had been reduced to £1014 last year. In the gas department, the policy adopted has been to meet liabilities; profit making being a secondary consideration. The actual profit on every ton of coal carbonized has been 8d., or £492 in all. The price of gas was raised 3d. per 1000 c.ft. in April and 9d. in October; while during the current year prices may have to be increased still further.

STOCK MARKET REPORT.

THE Stock Exchange cannot boast of having had a very brilliant week. Business was as limited as the week before—the restrictions upon members of the House then noted by us being still in force—and movements were irregular, according as markets chanced to catch a favorinug breeze of circumstances or the reverse.

In the gilt-edged market, Home Government issues on the whole were fairly steady. The 5 p.ct. Loan met with some support, and marked 94⅛ on the closing day, and the 4 p.ct. was in some request. Consols were not strong; but Bonds were firm. Home rails had a much more healthy appearance; labour questions being regarded with less misgiving. Canadians were dull almost up to the close, when they brightened a bit. Argentines were firmer.

The Foreign Market betrayed weakness in many lines. French, however, after a dull run, took a good turn on Friday. Russians were continuously bad, most of the South Americans were put down, and Swedes, Greeks, and Japanese were sufferers.

In Miscellaneous, perhaps the strongest market was Rubber, and Textiles and Iron and Steels showed improvement; but Oils were more offered than wanted.

Business in the Gas Market seemed to revive as August comes to an end, and showed more animation. There was a good deal of rectification of quotations, pointing to the effect on future dividends wrought by the rises in the price of gas rendered obligatory by the great advances in the cost of coal, material, and labour. But falls were not universal; and Gaslight and Coke and South Metropolitan even had a moderate recovery from their previous retrocession. Imperial Continental also rose 1. Primitiva, too, was firmer, in hopes of a brighter report from the Chairman upon affairs in Buenos Aires.

Bargains done for cash during the week were as follows: On Monday, Gas Light ordinary 53⅛, 53⅜, 54, 54⅛, 54⅜, 54½, 55, Imperial Continental 129½, 130, 130½, North Middlesex 13, 13⅛, Primitiva preference 73s. 9d., South Metropolitan 53⅛, 53⅜, 54⅛, 54⅜. On Tuesday, Brighton and Hove original 125, Commercial 4 p.ct. 57, ditto 3½ p.ct. 54, ditto debenture 50, 50⅛, Gas Light ordinary 54, 54⅛, 55, ditto preference 65, ditto debenture 53, Imperial Continental 129⅛, Monte Video 12⅞, 13⅛, Primitiva 33s. 9d., ditto preference 66s. 3d., 69s. 4½d., South Metropolitan 54⅛, 55, ditto debenture 52½. On Wednesday, Brighton and Hove original 125, ditto ordinary 87, Commercial 4 p.ct., 59½, European 12⅜, Gas Light ordinary 55⅛, 56, Imperial Continental 129, 130, 132, Liverpool 62⅜, Monte Video 13⅛, Primitiva preference 67s. 6d., South Metropolitan 54⅛, 55⅛, 56, South Suburban debenture 89½, Aldershot debenture 62½, Cape Town debenture 71. On Thursday, Cape Town 6⅛, Gas Light ordinary, 55, 55⅜, 56, Imperial Continental 130, Metropolitan of Melbourne 91½, Oriental 104, Primitiva 35s., ditto preference 67s. 6d., 70s., ditto debenture 72s., ditto debenture (1911), 50⅛, South Metropolitan 55⅛, 56, South Suburban 70. On Friday, Brighton and Hove original 125, Gas Light ordinary 56, 56⅛, 56½, ditto preference 65, ditto debenture 52⅜, Imperial Continental 130, Liverpool 62⅞, Primitiva preference 67s. 6d., 68s. 1½d., South Metropolitan 55, 56, ditto preference 94, ditto debenture, 52½.

In the Money Market, after a moderate demand a change set in, and rates ruled easy throughout. Silver had a rather surprising drop to 58d. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	July 31	4	4%	Aldershot 4 p.c. Pref.	..	60—65	..
1,551,858	"	April 8	2½	2⅞	Alliance & Dublin Ord.	59—64	45—55	..
874,000	"	July 11	4	4%	Do. 4 p.c. Deb.	76—79	60—62	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅛	5⅝—6½	..
60,000	10	Aug. 28	16	12½		20—30	19—20*	..
353,110	10	"	7	7%	Bournemouth Gas and Water — B 7 p.c.	15—15½	10—11*	..
115,000	10	"	6	6%	Bournemouth Gas and Water — Pref. 6 p.c.	13½—14	9⅜—9¾*	..
159,740	—	June 27	—	4%	Bournemouth Gas and Water — 4 p.c. Deb.	..	66—67	..
992,045	Stk.	July 11	14	37/-	Brentford A Consolid.	251—266	60—65	..
784,920	"	"	11	31/8	Do. B New	204—209	55—60	..
55,000	"	"	5	5%	Do. 5 p.c. Pref.	108—111	76—78	..
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—93	64—66	..
214,775	"	Feb. 26	11	7½%	Brighton & Hove Orig.	208—218	125—130	125
344,200	"	"	8	5⅞%	Do. A Ord. Stk.	154—159	85—91	87
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Mar. 26	12½	10%	British	44—45	28—30	..
120,000	Stk.	June 27	4	4%	Do. 4 p.c. Deb. Stk.	88—90	63—65	..
245,771	10	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	50—58	..
100,000	10	"	—	—	CapeTown & Dis., Ltd.	1½—2½	6½—7	6⅞
180,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7—7½	..
100,000	Stk.	June 27	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	61—66	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,615,250	"	Aug. 14	5/9/4	80/-	Commercial 4 p.c. Stk.	106—108	57—60	57—59½
580,000	"	"	5½	96/8	Do. 5 p.c. do.	108—105	54—57	54
475,800	"	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	50—52	50—50½
800,000	"	"	4	—	Continental Union Ltd.	76—79	43—48	..
900,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	65—70	..
1,003,180	Stk.	July 30	10	5/0	European, Ltd.	17½—18	12—14	12¾
16,398,975	"	"	4/17/6	80/-		98—102	55—57	53½—56½
2,600,000	"	"	3½	26/8	Gas Light and Coke — 4 p.c. Ord.	76—79	44—50	..
4,992,325	"	"	4	4%	Gas Light and Coke — 5½ p.c. max.	96—99	65—68	65
4,974,856	"	June 11	8	8%	Gas Light and Coke — 4 p.c. Con. Pref.	72½—74½	52—55	52½—53
180,000	"	"	10	10%	Gas Light and Coke — 3 p.c. Con. Deb.	..	..	..
89,500	"	Mar. 12	5	4½%	Gas Light and Coke — 10 p.c. Bonds	..	..	..
958,740	"	—	3½	2½%	Hastings & St. L. 5 p.c.	..	59—64	..
70,000	10	April 29	11	7%	Do. 3½ p.c	37—39	44—49	..
66,500	Stk.	Aug. 28	9	8½%	Hongkong & China, Ltd.	16½—16¾	1⅞—2⅜	..
131,900	"	Mar. 12	7½	5½%	Hornsey 7 p.c.	..	110—115*	..
65,780	"	"	6⅔	4½%	Ilford A and C.	151—154	90—95	..
65,500	"	June 27	4	4%	Do. B.	115—118	69—74	..
4,940,000	"	May 14	9	4½%	Do. 4 p.c. Deb.	92—94	61—64	..
1,235,000	"	Aug. 14	8½	8½%	Imperial Continental	156—160	128—133	129½—132
235,342	"	Mar. 12	6½	6½%	Do. 5½ p.c. Deb. Red.	84—86	79—81	..
2,498,905	"	Feb. 26	10	42/6	Lea Bridge Ord. 5 p.c.	119—121	90—95	..
806,088	"	June 26	4	4%	Liverpool 5 p.c. Ord. A	211—213	..	62½—62½
165,736	"	Aug. 14	7/5/6	31½%	Liverpool 5 p.c. Ord. B	146—148	..	
75,000	5	June 11	6	5%	Do. 4 p.c. Pr. Deb. Stk.	..	..	..
250,000	100	April 1	4½	4½%	Maidstone 5 p.c.	..	58—61	..
541,920	20	May 29	4	5%	Malta & Mediterranean Met. of Melbourne — 4½ p.c. Deb.	4½—4¾	3½—3⅔	..
1,875,823	Stk.	July 30	4½	3½%	Monte Video, Ltd.	99—101	91—98	91½
522,725	"	June 27	3½	3½%	Newcastle&Gatsh'dCon.	11½—13	12½—13½	12⅞—13⅛
15,000	10	Mar. 13	—	11%	Do. 3½ p.c. Deb.	98½—99½	64—65	..
55,940	10	"	7/14/0	7%	North Middlesex 10 p.c.	82—83	57—58	..
300,000	Stk.	May 14	8	8%	" " 7 p.c.	..	13½—14	13—12⅛
60,000	5	Mar. 26	10	1/-	Oriental, Ltd.	14—15	9½—9⅔	..
80,000	50	Aug. 28	18	7½%	Ottoman, Ltd.	117—122	103—106	104
100,000	50	"	12	6⅔%	Portsea, Island B	7½—7⅝	4⅔—5⅛	..
249,980	5	April 29	8	—	Do. C	128—131	74—76*	..
499,960	5	June 26	5	—	Primitiva Ord.	118—121	56—58*	..
521,600	100	June 2	4	4%	Do. 5 p.c. Pref.	5½—6	1½—2	88/9—85/-
600,000	Stk.	July 30	4	4%	Do. 4 p.c. Deb.	4½—5	3½—3⅝	66/3—73/9
846,198	"	June 27	4	4%	Do. " " 1911	91—93	71—73	72
150,000	10	May 14	6	6/-	River Plate 4 p.c. Deb.	..	49—52	50½
125,000	50	July 2	5	5%	San Paulo — 6 p.c. Pref.	85—87	49—52	..
135,000	Stk.	Mar. 12	10	5%	San Paulo — 5 p.c. Deb.	10½—11	7½—8	..
209,984	"	"	10	5%	Shefield A	41—49	40—42	..
528,500	"	"	10	4⅔%	Do. B	223—224	88—87	..
188,201	Stk.	Sept. 12	4	4%	Do. C	229—234	88—87	..
90,000	10	June 27	9	10%	Shrewsbury 5 p.c.	220—222	72—74	..
6,509,895	Stk.	Aug. 14	5/4/0	80/-	South African.	..	..	..
250,000	"	July 11	—	5%	South Met. 4 p.c. Ord.	10½—11½	12½—13½	..
1,595,445	"	"	8	8%	Do. Pref.	111—113	54—57	53½—56
224,920	"	Aug. 14	8½	5%	Do. 3 p.c. Deb.	..	94—96	94
962,795	"	"	6	3⅔%	South Shields Con. Stk.	72½—74½	52—54	52½
187,558	Stk.	June 27	5	5%	S'th Suburb'n Ord. 5 p.c.	157—159	97—99	..
647,740	"	May 14	7½	5%	Do. 5 p.c. Deb. Stk.	114—116	70—75	70
121,275	"	June 27	4	4%	Southampton Ord.	116—118	88—91	89½
120,000	"	Aug. 14		4½%	Do. 4 p.c. Deb. Stk.	99—102	63—68	..
782,275	"	"	6	3⅔%	Tottenham District — A 5 p.c.	..	63—65	..
181,255	"	June 26	4	4%	Tottenham District — B 3½ p.c.	186—188	70—75	..
183,380	10	Dec. 30	5	—	Tottenham District — 4 p.c. Deb.	115—117	50—55	..
149,900	10	July 1	5	5%	Tuscan, Ltd.	87—89	64—66	..
296,476	Stk.	Mar. 12	5	5%	Do. 5 p.c. Deb. Red.	5—6	1—2	..
					Tynemouth 5 p.c. max..	93—95	45—50	..
80,000	"	Aug. 28	8⅔	55/-	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c..	108½—109	82—84	..
956,696	"	"	6½	40/-	Do. B 3½ p.c.	151—156	85—90*	..
108,075	"	"	—	88/6	Do. C	129—134	63—68*	..
140,865	"	"	—	88/6	New Ordinary	..	63—68*	..
353,000	"	"	6⅔	33/9	Wimbledon 5 p.c.	..	63—68*	..
98,000	"	"	6⅔	40/-	Epsom 5 p.c.	117—122	65—70*	..
88,416	"	June 27	8	8%	3 p.c. Deb. Stk.	121—126	65—70*	..
						66—69	49—51	..

* Ex Div.

Satisfaction at Sutton.

It was reported by the Directors at the half-yearly meeting of the Sutton (Surrey) Gas Company that there was a balance available for division of £6149, from which they recommended the payment of a dividend under the sliding-scale of 4¼ p.ct., less income-tax. The Chairman (Mr. Thomas Charles) drew attention to the exceedingly difficult position in which gas undertakings had been placed during the past six months, and the very favourable position their Company held compared with others. It must, he said, certainly be a great satisfaction to consumers of gas in the town to know that, notwithstanding all the difficult circumstances, the shareholders had voluntarily made heavy sacrifices in order that their customers might enjoy the advantage of getting one commodity at a cheap rate. The statement of accounts showed a satisfactory increase, and reflected very great credit upon the Manager (Mr. Stephen Carpenter), to whom they were all really indebted for it. In seconding the motion for the adoption of the roport and accounts, Alderman Holland remarked that they certainly could not be charged with profiteering in any shape or form, seeing that before the war they got their 6 p.ct., whereas now, however well they might do, they could not, under the sliding-scale, take more than 4¼ p.ct. They desired a revision of the sliding-scale to make it applicable to the present time. It should provide a fair arrangement as between the consumer and the shareholder. Having to take seaborne coal would impose a very heavy additional burden upon them. Mr. J. Ferguson Bell (the Consulting Engineer), proposing a vote of thanks to the Directors and officers, said he called the balance-sheet an eminently satisfactory one under the circumstances. Their friend, Mr. Carpenter, had managed during the last half year to make 14,000 c.ft. of gas out of each ton of coal carbonized, and had sold nearly 11½ cwt. of coke per ton. He had also obtained nearly 26·7 lbs. of sulphate of ammonia per ton. This was one of the best engineering returns he had ever seen.

Profits and the Rates at Blackpool.—According to the annual report of the Blackpool Borough Treasurer, the gas department has a total capital of £450,393, of which £153,360 is represented by sinking and reserve funds. The undertaking has been in the hands of the local authority since 1861. For the first two years there were losses recorded. Every year since, however, there have been considerable profits; and these, in the aggregate, have amounted to £384,236, of which no less than £299,071 has gone to the relief of the rates.

The Directors of the British Gas Light Company, Ltd., at the half-yearly general meeting to be held on the 24th inst., propose to recommend, subject to audit, a dividend, payable in October, at the rate of 10 p.ct. per annum (less income-tax), for the six months to June 30.

The important work which is undertaken by the National Alliance of Employers and Employed in harmonizing the relations between capital and labour is said to be making rapid headway. Over 25,000 industrial firms and 2,500,000 workers have attended the hundred industrial conferences which have now been held.

The new lighting trade catalogue of the Provincial Incandescent Fittings Company, Ltd. ("Pifco"), extends to over a hundred pages, each one containing several illustrations; and the range of goods covered is a very wide one. The Company's warehouse and showrooms are at "Pifco" House, High Street, Manchester.

A business man in Brussels desires to obtain an agency, on commission, for a United Kingdom firm manufacturing gas and electric light fittings of all kinds. Inquirers (quoting "Belgium, No. 522) should be addressed to the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, S.W. 1.

The Easington Rural District Council (Durham) have decided to oppose the application of the Seaham Gas and Lighting Company for an Order permitting them to increase the price of gas from 3s. 6d. to 4s. 9d. per 1000 c.ft.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Aug. 27.]

Nos. 20,225—20,793.

ARMSTRONG, H. L.—"Distillation of coal, &c." No. 20,598.
" "Retort-settings." No. 20,599.
BARRETT COMPANY.—"Process of oxidizing anthracene." No. 20,707.
BLAKE, H. H.—"Gas nipple." No. 20,787.
BROOKE, H. L.—"Gas and vapour pumps for two-stroke internal-combustion engine." No. 20,750.
BÜCHI, A.—"Two-stroke cycle internal-combustion engine." No. 20,301.
CLARE, E. W.—"Device for stopping leak in tanks, &c." No. 20,263.
" "Device for stopping leakage at pipe, &c., connections or unions." No. 20,264.
COLLINGS, J. H.—"Locking device for gas-fittings." No. 20,696.
DAVIDSON, S. C.—"Manufacture of fuel." No. 20,710.
" "Manufacture of fuel for producer gas." No. 20,711.
DAVIDSON, T. M.—See Armstrong. No. 20,598.
" "Distillation of coal." No. 20,600.
DEVINE, M.—"Gas fire-lighters." No. 20,296.
DIBDIN, L. A.—"Revivifying spent oxide." No. 20,322.
DOBSON, G. M. B.—"Meters for indicating rate of flow of fluids." No. 20,629.
FINLAYSON, T. C.—"Separation and utilization of sulphur from coal gas, &c." No. 20,533.
GALSWORTHY, S. S.—"Combined direct and indirect lighting fitment." No. 20,363.
HARGER, J.—"Manufacture of tarless fuel, &c." No. 20,259.
HENNING, C. B.—See Devine. No. 20,296.
LITTLEFIELD, W. R.—See Clare. Nos. 20,263, 20,264.
LOW-TEMPERATURE CARBONIZATION, LTD.—See Armstrong. Nos. 20,598, 20,599.
LOW-TEMPERATURE CARBONIZATION, LTD.—See Davidson. No. 20,600.
MARSHALL, F. D.—"Gas-producers." No. 20,590.
" "Heat-exchange apparatus." No. 20,591.
" "Gas-washing apparatus." No. 20,592.
" "Air-saturating towers." No. 20,593.
MORGAN, J. S.—See Finlayson. No. 20,533.
NIELSEN, H.—See Marshall. Nos. 20,590, 20,591 20,592, 20,593.
PILLIVANT, F. T.—"Packing-boxes and carriers for inverted incandescent mantles." No. 20,547.
RAILING, M. J.—See Collings. No. 20,696.
SAUNDERS, C. W.—See Collings. No. 20,696.
SCOTT, G. B.—"Conversion of waste products of coal, &c., into inflammable gas for consuming in furnaces." No. 20,651.
SHANNON, J. & R. W.—"Water-heaters." No. 20,756.
SMITH, W. S.—See Dobson. No. 20,629.
VINCENT, F.—See Blake. No. 20,787.
WELLS, J.—"Gas-cleaning apparatus." No. 20,504.
" "Gas-producers." No. 20,697.
YEO, O. E.—"Gas-producers." No. 20,568.

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